National Library of Canada
Canadian Theses Service
Ottawa, Canada
K1A 0N4

Bibliothèque nationale du Canada
Services des thèses canadiennes

CANADIAN THESES

THÈSES CANADIENNES

NOTICE

The quality of this microfiche is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us an inferior photocopy.

Previously copyrighted materials (journal articles, published tests, etc.) are not filmed.

Reproduction in full or in part of this film is governed by the Canadian Copyright Act, R.S.C. 1970, c. C-30.

AVIS

La qualité de cette microfiche dépend grandement de la qualité de la thèse soumise au microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de qualité inférieure.

Les documents qui font déjà l'objet d'un droit d'auteur (articles de revue, examens publiés, etc.) ne sont pas microfilmés.

La reproduction, même partielle, de ce microfilm est soumise à la Loi canadienne sur le droit d'auteur, SRC 1970, c. C-30.

THIS DISSERTATION HAS BEEN MICROFILMED EXACTLY AS RECEIVED

LA THÈSE A ÉTÉ MICROFILMÉE TELLE QUE NOUS L'AVONS REÇUE

NL-339 (r.86/06)

Canada

THE UNIVERSITY OF ALBERTA

THE PRAGMATIC AND INTERACTIONAL SKILLS OF CHILDREN DEVELOPING LANGUAGE

BY

THERESA ANN STEWART

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF EDUCATION.

IN

SPECIAL EDUCATION

DEPARTMENT OF EDUCATIONAL PSYCHOLOGY

EDMONTON, ALBERTA

(SPRING) (1987)

Permission has been granted to the National Library of Canada to microfilm this thesis and to lend or sell copies of the film.

The author (copyright owner) has reserved other publication rights, and neither the thesis nor extensive extracts from it may be printed or otherwise reproduced without his/her written permission.

L'autorisation a été accordée à la Bibliothèque nationale du Canada de microfilmer cette thèse et de prêter ou de vendre des exemplaires du film.

L'auteur (titulaire du droit d'auteur) se réserve les autres droits de publication; ni la thèse ni de longs extraits de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation écrite.

ISBN 0-315-37834-4

THE UNIVERSITY OF ALBERTA

RELEASE FORM

NAME OF AUTHOR : THERESA ANN STEWART

TITLE OF THESIS : PRAGMATIC AND INTERACTIONAL SKILLS OF CHILDREN DEVELOPING LANGUAGE

(C)

DEGREE : MASTER OF EDUCATION

YEAR THIS DEGREE GRANTED : 1987

Permission is hereby granted to THE UNIVERSITY OF ALBERTA LIBRARY to reproduce single copies of this thesis and to lend or sell such copies for private, scholarly or scientific research purposes only. The author reserves other publication rights, and neither the thesis or extensive extracts from it may be printed or otherwise reproduced without the author's written permission.

Theresa A. Stewart

222 Hillington Court
Edmonton, Alberta

Date: April 21, 1987

THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled

The Pragmatic and Interactional Skills of Children Developing Language

submitted by Theresa Ann Stewart

in partial fulfillment of the requirements for the degree of

Master of Education

in Special Education.

Graeme Kysela
Supervisor

Linden M. Mowatt

Gary Holtzapfel

Date: April 21, 1987.

Abstract

Young children's pragmatic skills have been linked to dyad (parent- child, child-child) interaction characteristics. In order to analyze the relationship between these competencies and language acquisition, the children's interactions and expressive language in play and communication tasks were observed. Normative developmental measures were also administered and analyzed in relationship to the dyads' skills. These relationships were examined because of the proposal from early language interventionists regarding the importance and prerequiste nature of competent interaction skills for language acquisition.

Fourteen infants between 15 & 19 months and their mothers were observed for their interaction, pragmatic, and communication skills. Administration of the Bayley Scales of Infant Development, the Sequenced Inventory of Communication Development, and the Ordinal Scales of Psychological Development established the infants to be developing normally. Infants' expressive langyage was quantified through an in-home language sample in terms of lexicon size and type/token ratio. Dyadic play was analyzed for interaction characteristics and communication strategy use by both infants and mothers. Infants were observed for their communicative uses of words within their expressive lexicons. Situations were presented to provide the children with opportunities for using declarative and imperative performatives.

Correlations between the various aspects of the dyads' communication and interaction

skills suggested the potential importance of mode-matched and extended interaction sequences to language acquisition. Additionally, imitation and expansion strategies were found to be significantly related to lexicon size and the pragmatic uses of linguistic communication.

Implications were discussed for future studies of language acquisition, dyad interaction, and pragmatic use of early lexicon. Possible implications for current intervention methods were discussed in terms of the efficacy of specific interaction strategies.

Acknowledgements

I would like to acknowledge and sincerely thank those people who assisted me in carrying out this study.

In particular I would like to thank my advisor, Dr. Gerry Kysela who provided me with guidance and unfailing faith that I would complete the project.

I appreciated the time, patience and wisdom of Dr. Gary Holdgrafer and Dr. Linda McDonald, my committee members.

My deep graditude goes to my roommates, the people who lived through this project with me. Their support and understanding will never be forgotten.

I would also like to thank my family who have always supported and believed in me.

A friend once told me that writing her thesis had been the most humbling experience of her life. I agree. Without the support of so many people, it could not have been done.

TABLE OF CONTENTS

Chapter		Page
1	INTRODUCTION	1
	The Problem	1
	Statement of the Problem	3
2	REVIEW OF THE LITERATURE	6
	Introduction	6
	Cognitive Factors	6
	Pragmatic Factors	10
	Social Context	15
	Linguistic Environment	19
3	RATIONALE AND RESEARCH QUESTIONS	23
	Rationale	23
	Research Questions	24
	Normative Developmental & Linguistic Information	24
	Lexicon Availability & Pragmatic Function	26
	Interaction Measures & Communicative Function	28
4	METHODOLOGY	32
	Participants	32
	Settings	35
	Procedures	35

METHODOLOGY CONT

Language Sample & Standardized Language Measurement. 36
Measures of Infant Cognitive Development. 39
Mother-Infant Interaction. 42
Communication Tasks. 43
Audiological Screening. 45
Interaction Analysis. 46
Mother-Infant Interaction. 46
Communication Strategies. 48
Communication Tasks. 48
Observer Training & Reliability. 49
Mother-Infant Interaction. 49
Communicative Strategies. 49
Communication Tasks. 51
Internal and External Validity. 52
Study Design. 53
Threats to Internal Validity. 54
Threats to External Validity. 55

5 RESULTS. 58
Normative Developmental & Linguistic Information. 58
Lexicon Availability & Pragmatic Function. 61
Interaction Measures & Communicative Function. 62

6 DISCUSSION. 71
Normative Developmental & Linguisitic Measures. 71

DISCUSSION CONT

Lexicon Availability & Pragmatic Function 74
Interaction Measures & Communicative Functions. 76
Limitations of the Statistics. 82
Post-hoc Findings. 82
Implications for Further Research. 85
Implications for Intervention. 86
Summary. 88
Conclusions. 89

BIBLIOGRAPHY. 90

APPENDICES. 103
Appendix A. Toys Utilized in Turntaking Tasks 104
Appendix B. Maternal Instructions for Interaction Sessions 106
Appendix C. Specific Toy Instructions. 108
Appendix D. Maternal Instructions for Communication Tasks. 110
Appendix E. The Preschool Observation System 112
Appendix F. The Preschool Observation System Record Analysis Form. 116
Appendix G. Communication Strategies: Definitions. 118
Appendix H. Communication Strategies Score Form 123
Appendix I. Coding Procedures for Communication Tasks 125
Appendix J. Communication Tasks Score Form. 128

LIST OF TABLES

Table	Description	Page
1	Measures of Linguistic & Cognitive Development	33
2	Child Scores on the Ordinal Scales of Psychological Development	40
3	Calculations of Reliability	50
4	Correlations amoung Child Linguistic Measures	60
5	Correlations amoung Child Linguistic Measures and Dyad Interaction Measures	63
6	Correlations amoung Child Linguistic Measures and Dyad Communication Strategies	66
7	Correlations amoung Dyad Communication Strategies and Interaction Measures	69
8	Correlated Measures - Post-hoc	84

Chapter 1

Introduction

The Problem

The miracles that occur to allow a toddler to utter her first word can only be truly appreciated by a delighted and awed parent - and a student of language development. Although the first individual can enjoy this event for its mere occurence, the second, by her very nature, must go beyond the emotional response and seek to find how this has happened.

Students of language development have varied in their quests by their backgrounds and their approaches to the mysteries of the skill that seperates humanity from all other creatures. Modern day students have benefitted from the work of their predessors and carried on. From this vast source of accumulated knowledge, four domains of child development can be identified as contributing to language development as it manifests itself in speech.

The relationship that exists between cognitive factors and language development has received much attention both from the theoretical perspective (Vygotsky, 1962; Piaget, 1952, 1954; Cromer, 1973; Edwards, 1973) and the empirical standpoint (Smolak, 1982; Slobin, 1973; Bowerman, 1973; Bates, Camaioni, & Volterra, 1979). Over time, studies of cognitive factors have undergone major changes of focus in regards to the

roles of structure and innately preprogrammed syntactic relationships (Chomsky, 1957, 1965), semantic relations and taxonomies (Bloom, 1970; Brown, 1973), semantic relations, and sensorimotor parallels to the acquisition of language (Piaget, 1954; Sinclair de-Zwart, 1969, 1973; Gopnick and Meltzoff, 1984).

In the last decade, the social bases of language acquisition have also been recognized as major components in a child's development. The social context has come to be been widely accepted as the environment that supports and leads to communication development and eventually language acquisition. The literature has suggested that it is through the social interactions, that is, the joint attention and activities shared with significant others, that children learn the role shifting, sequencing and turn-taking necessary for conversation (Bruner, 1975; MacDonald & Gillette, 1984) and lexical development (Tomasello & Farrar, 1986).

The intentions behind children's first communications have also been cited as extremely influencial in the early stages of language development (Miller & Yoder, 1972; Bates, Camaioni, & Volterra, 1979; Dore, 1975; Halliday, 1975) thus the pragmatic functions of young speakers have been widely explored for their part ~~in~~ language acquisition (Bruner, 1975).

Additionally, the role of the linguistic environment in which a child is immersed, has received particular attention in the area of mothers' dialogue with the infants (Newport, Gleitman & Gleitman, 1977; Snow, 1972, 1977; Ling & Ling, 1974). Specific strategies adopted by mothers while interacting with their infants have been reported to be central

to the infants' development. For example, Pawlby (1977) has written extensively on imitation as a crucial strategy for both mother and infant. Scherer & Olswang (1984) and Barnes, Gutfreund, Satterly & Wells (1983) have reported mothers' use of linguistic expansions in response to their children's utterances, to be related to children's acquisition of semantic relations and utterance length.

Some of the theory and findings presented from observations and empirical means in the aforementioned domains have been applied in the intervention field. Several current and popular intervention approaches to delayed language development have a central goal of establishing balanced dyadic interactions between delayed infants and their significant others, and minor goals that include instructing adults on the use of specific strategies such as imitation and expansion (Manolson, 1983; MacDonald, 1985). Girolametto (1985) has pointed out that there has been only limited research to support the usefulness of such approaches, and no indication of the existence of a relationship between changed dyadic interaction style and improved child communication. Within the field of normal language acquisition there is a parallel absence of research regarding the relationships between dyadic interaction styles and components of language acquisition such as lexicon, and pragmatic function. Consequently, there is a need for research that explores these relationships in children developing language normally. Such research could add to the knowledge base of normal acquisition as well as raise possible questions as to the appropriateness of intervention approaches.

Statement of the Problem

There exists a lack of research examining the relationships between the dyadic interactions between infants developing language normally and their mothers, and infant language characteristics such as pragmatic use of the lexicon. This is particularly significant in view of the current clinical approaches to language intervention that are based on the assumption that remediation of the dyadic interactions will result in improved communication skills (Manolson, 1983; MacDonald, 1985). The possible relationships that exist between these two components of normal acquisition have not yet been identified, presenting a lack of a theoretical base within normal development for the intervention approaches.

The intent of this study was to establish the existence of relationships between dyadic interaction styles, early pragmatic functioning, and children's language acquisition. Interaction characteristics included the length and nature of turn-taking sequences, as well as the use of the imitation, initiation and expansion strategies. Pragmatic functioning was observed in the infants' use of linguistic versus nonlinguistic responses to set situations. The characteristics of interest in the children's language acquisition were those of lexicon size, lexicon availability(word use) in imperative and declarative communication situations, a comparison of total number of words in the lexicon to the number of different words, and a formal measurement of receptive and expressive language development (Hedrick, Prather, and Tobin, 1984).

The children involved in the study were considered to be cognitively normal children whose language skills were developing normally. Administration of the Receptive and Expressive Scales of the Sequenced Inventory of Communication Development (Hedrick, Prather, and Tobin, 1984) and the Physical and Motor Development Indices of the Bayley Scales of Infant Development (Bayley, 1969), as well as the mother's initial estimate of the child's development, were used to determine each child's appropriateness for the study. Further information such as audiological screenings were enlisted to substantiate the children's appropriateness.

Descriptive information on the children's language acquisition was collected during two-hour language samples in the homes. Data on the nature of the dyadic interactions was collected during structured play sessions held in a laboratory. The pragmatic data was also collected in a laboratory under structured conditions. Statistical comparisons of the various measures were carried out in order to examine the relationships that exist between the specific components of language acquisition and dyadic interactional styles.

A review of the literature relevant to this study is presented as Chapter 2. Chapter 3 presents the specific research questions as well as rationale for the study.

Chapter 2

Literature Review

Introduction

Language is traditionally defined as an arbitrary system by which humans commmunicate thoughts, feelings and ideas (McLean and Snyder-McLean, 1978). Whatever the nature or mode of these communications, they are the outcome and means of expression of the thoughts, feelings and desires that humans wish to share. Language does not exist as an isolated entity but as the vehicle for communication of the user's thoughts and desires. Nor does language develop in isolation; but, within the social environment in which a newborn develops. The beginnings of intentional communication are a result a child's having something to communicate, the desire to communicate, and the supporting social and linguisitic environments in which she develops.

Cognitive Factors

There is no doubt that as a child matures, language and cognition become so intertwined and supportive of each other that the complex relationships between the two are endless. Even in the early stages of language development, the relationship between language and the nonlanguage operations of an infant's mind is close and interactive. McLean and Snyder-McLean (1978) have written an extensive review of the cognitive

bases of language acquisition and in doing so have identified four major aspects to consider. A discussion of those four aspects of cognitive development and their relationship to language development will follow.

Bloom (1970) began what is sometimes referred to as the "semantic revolution" by recording, along with the syntactic grammars of children, the meaning of the utterances as interpretted from the context and situation. The previously popular method of describing children's utterances strictly on the basis of grammars (Chomsky, 1957; 1965) failed to fully reflect the underlying meaning of the utterances. This structural method in fact missed many grammatical relationships because it failed it take into account the meaning or intent of the utterance. Bloom's now famous examples of the two occurrences of the utterance "mommy sock" indicated two seperate meanings and grammatical structures. One utterance commented on the possession of a sock while the other requested an action with the sock. Bloom (1970) identified a number of semantic categories (i.e. , utterances specific to the relationships of objects, people and events in the child's context of time and space) and disputed Chomsky's proposal of a child's innate predisposition toward language structure. The three different grammars that Bloom (1970) observed from three children under her observation, led to the conclusion that the differences were reflections of "individual differences in the interaction between cognitive function and experience, which could not be assumed to be the same for any two children." (p. 227).

Schlesinger (1971) also proposed semantics as a basis for language utterances by recognizing emerging language as semantic rather than syntactic in nature. Similar

findings by Fillmore (1968) and Chafe (1970) have supported the notion of semantically based grammars and apparently universal relationships between words as derived from their analyzes of children's emerging utterances. Brown (1973) has proposed the semantic relationships of agentive, instrumental, dative, factitve, locative, and objective as the basis of early utterances.

McLean and Snyder-McLean (1978, p.22) have summarized the contributions of the semantic perspective to language acquisition. It is recognized that children's early language utterances appear to be expressions of perceived semantic relationships and not expressions of innately preprogrammed syntactic relationships. Accordingly, semantic relationships reflect the perception and understanding of relationships among the entities and actions which are present in a child's environment. The understanding of these relationships must be considered the products of the cognitive domain of human functioning and a reflection of her knowledge of the relationships among and between the entites and the actions which make up her world. In this way, language "maps" onto or encodes a child's existing knowledge (McLean & Snyder-McLean, 1978).

The contributions of many writers and investigators regarding the universal knowledge base of language (Sinclair de-Zwart, 1969, 1973; Slobin, 1973; Bowerman, 1973; Bloom, 1973; Nelson, 1974) can been summarized in this way (McLean & Snyder-McLean, 1978). Semantic universals in children's language appear to be well documented on the basis of existing general cognitive universals among children learning language. Basic theories of cognitive development recognize the child's sensorimotor

interactions to be the universal process for organizing specific cognitive schemata. These cognitive schemata show a direct correspondence to the substance of early semantic categories. The interactive nature of the process of cognitive development is consistent with the process hypothesized to be required for language learning and both processes are characterized as being relational. Thus, the apparent correlations between the cognitive schemata and semantic concepts suggest that common processes may be functioning in the realization of both types of concepts (McLean & Snyder-McLean, 1978).

Another perspective of the cognitive bases of language acquistion is that of the representational or symbolic behaviors involved. The definition of language typically refers to the arbitrary association between meanings and symbols. McLean and Snyder-McLean (1978) view the symbolic abilities of children to be so independent of other cognitive functions, that they must be considered more narrowly as prerequiste to language acquisition than any of the other cognitive functions. The symbolism of language use is facilitated by the development of general cognitively based symbolism. For example, the sight of a child's mother means (symbolizes) something pleasant such as feeding or cuddling to a child. This basic association between mother and what she does must preceed the association between mother as an entity and the word that represents her. The internal recognition and association of mother and what she represents must exist before the word can be glossed on to that knowledge.

The communicative purposes and the referents involved in the communication act itself contribute another perspective to the cognitive bases of language acquisition. The

cognitive aspects of communication take into account the role and knowledge of the listener, the purpose of the utterance, and its effects on meaning and the communication act itself (Olson, 1970). This perspective strongly suggests that the true content of an utterance can be missed if a strictly linguistic approach to analysis is adopted (McLean & Snyder-McLean, 1978).

In summary, language content has its bases in the child's knowledge of entities and the relationships that exist between these. Language reflects the child's knowledge of the world as gathered through sensory and social interactions with the environment. The structure of a child's utterance is determined by the relationships contained in the utterance. The communicative functions of language influence both the structure and content of utterances.

Pragmatic Factors

Language does not exist as an end in itself but as a means to the achievement of some specific social or communication function. So too, does language develop. Miller and Yoder (1972) have written that children must not only have something to say and a way to say it but a reason to say it.

The purposes of early communication are varied, and increase along with the child's overall development in the areas of cognitive and social interaction. The study of why children communicate, specifically the language they use to communicate, has come to be known in the literature as "pragmatics". Pragmatics has been defined by Bruner (1975)

as the "directive function of speech through which speakers affect the behavior of others in trying to carry out their intentions" (p.283). Pragmatic rules are defined over messages- verbal or nonverbal- in that requests can be made with facial expressions or sentences (Foster, 1985).

Bruner (1975) has written that the crucial factor in understanding how language is acquired, is understanding how it is initially used. "... language is acquired as an instrument for regulating joint activity and joint attention. Indeed, its very structure reflects these functions and its acquisition is saturated with them" (Bruner, 1975, p.2). Bruner (1975) has, in fact, cited the most basic functions of preverbal children's communications to be that of achieving and regulating joint attention and joint action. Surprisingly early in a child's life, mother and child share attention toward objects, persons, and events; and this is achieved through what Bruner has called joint referencing. The objective of joint referencing "is to indicate to another by some reliable means which among an alternative set of things or state or actions is relevant to the child's and mother's shared line of endeavour" (Bruner, 1977, p. 275). In clarification of this, Bruner (1977) has identified three aspects of early reference procedures: indicating, deixis, and naming. Indicating refers to the gestural, postural, and idiosyncratic vocal procedures for bringing one partner's attention to an object or action or state. Deixis refers to the use of spatial, temporal, and interpersonal contextual features of situations as aids in the management of joint reference. Thirdly, naming refers to association of lexical items with extra-linguistic events shared by the infant and

her caretaker.

Indicating occurs early in the first year as a mother's line of regard follows the infant's. In general, joint attention in infancy is accomplished primarily by the mother following the child's attentional lead (Collis & Schaffer, 1975). A mother's constant monitoring and following of the child's focus gives importance and shared meaning to that focus of attention (Collis & Schaffer, 1975). At as early as four months, a child is able to follow an adult's line of regard when it is turned toward a location removed from the child (Bruner, 1977). Additionally, a child shows the use of devices such as patting or touching an object, or vocalizing in a particular way for marking her focus of attention. Thus, during the prelinguistic stage, there exists a mutual system by which joint selective attention between an infant and her caretaker is assured, under the control of either the caretaker or the infant (Bruner, 1977; Foster, 1985).

Joint referencing logically leads to joint action with the object to which the attention was directed. Bruner (1977) considers joint action to be an elaboration of joint referencing, which combines directing attention with sharing of some form of reciprocal action with the object. Joint action routines begin very simply and become more complex as the child develops. Aspects such as length of exchange and the complexity of each turn increase as the dyad progresses in its play together. Co-occurrence of gaze, action, and vocalization provide elaboration for the routines.

Beyond joint attention and joint action, the two general uses of an infant's communications, several pragmatic functions co-exist. The literature on these pragmatic

functions has been descriptive in nature and has provided taxonomies or classifications that account for the range of the observed functions. Specifically, the early pragmatic functions of emerging language has been reported by individuals such as Halliday (1975) & Dore (1975). Both have suggested taxonomies which show much consistency and support with each other's and the two basic functions identified by Bruner (1975). For example, Bruner's function of regulating joint actions fits easily with Halliday's (1975) more specific functions of instrumental ("I want") and regulatory ("Do as I tell you"); and Dore's (1975) communicative functions of requesting action, calling, and protesting. Additionally, Bruner's broad function of regulating joint attention refers to much the same intents as Halliday's interactional ("Me and you"), personal ("Here I come"), heuristic ("Tell me why"), imaginative ("Let's pretend") and informative ("I've got something to tell you") categories and parallel Dore's greeting, labelling, requesting answers, repeating answering, and practicing functions.

Bates, Camaioni & Volterra (1979) have adapted terminology first introduced by Austin (1962) in reference to the communicative purposes and effects of 'speech acts'. Bates et al. (1979) have thus referred to the stages of intentional communication that children pass through in these ways. During the 'perlocutionary' stage, a child has a systematic effect on on her listener without having the awareness or intention of doing so. The 'illocutionary' stage sees the child intentionally use nonverbal signals to convey requests and direct adult attention to objects and events. When a child reaches the 'locutionary' stage, she is contructing propositions and conveying them through speech.

The field of children's pragmatics concentrates on 'illocutionary acts' or 'performatives', the child's intentional communications through verbal and nonverbal means (Bates et al., 1979).

Bates (1976) has defined performatives specifically as children's intentions when communicating. The two most general pragmatic functions of performatives have been identified are imperative and declarative in nature. Bates et al. (1979) have defined an imperative utterance (or a 'protoimperative' in the case of a preverbal imperative) as one that controls a listener's behavior by directing the listener to do something. More specifically, Chapman (1981) has defined a protoimperative as the child's use of means to cause the adult to to do something. Bates et al. (1979) have adopted the definition of Parisi & Antinucci (1976) in which a declarative performative (or a preverbal 'protodeclarative') is an attempt to command the listener to attend to or assume some piece of knowledge; it is a particular type of imperative. Chapman specifies that a protodeclarative is an effort to direct the adult's attention to some event or object. Labeling, by the definition used by Bates et al. (1979) is one of the first occurrences of verbal declarative behavior to occur.

Nonverbal declarative behavior (protodeclarative) has been documented as appearing sequentially as showing off, showing, giving and/or pointing, eventually leading to labeling (Bates, Camaioni, & Volterra, 1979; Snyder, 1978; Sugarman-Bell, 1978). An ordered sequence for protoimperatives has also been reported (Snyder, 1978; Sugarman-Bell, 1978). Children's use of combining attempts to draw attention to

something and getting the adult's attention by use of such actions as pointing and grabbing the adult's hand have been reported as protoimperatives (Bates, Camaioni, & Volterra, 1979; Snyder, 1978).

One major variable in the studies of Snyder (1978), Bates, Camaioni, & Volterra (1979), and Sugarman-Bell (1978) was the sensorimotor development of their subjects as assessed by the Ordinal Scales of Psychological Development (Uzgiris & Hunt, 1975). Results suggested certain sensorimotor stages (based on Piaget) were prerequistes to declarative and imperative use. Means-ends and object permanence have been given specific attention. Assessment of such skills represents the investigators attempts to examine pragmatics skills in comparison to cognitive skills.

Bates, Camaioni & Volterra (1979) and Snyder (1978) have demonstrated the prelinguistic continuum through which communicative intent develops. Bruner (1977), Dore (1975), and Halliday (1975) have offered specific taxonomies. The social content in which all these functions first appear and develop will be addressed next.

Social Context

The social and communicative functions of language provide the reason and motivations for its development. Yet, these functions are achieved in a social context that facilitates much more than motivation to communicate. The social context in which mother-infant interaction occurs is also the context for learning language. The ecological perspective on child development and language acquisition has contributed much to the

discussion by observation of dyad interaction and subsequent conclusions that children do indeed acquire language in tandem with their significant others (Ainsworth, Bell, & Stayton, 1974; Blurton-Jones, 1972; Lewis and Rosenblum, 1974).

Language development has its beginnings in pre-intentional non-verbal communication very early in a child's life. Bruner (1981) believes the essential elements of the ritualized and often repeated interactions that occur between an infant and her mother, to be the familiarity of the structure to both members of the dyad. Within this repetitive format, the child knows where the adult's attention is and will be next. Any language that is glossed onto the routine is likely to be in context and immediately meaningful to the child. It is also during the early occurrences of joint attention and joint action (Bruner, 1975) that a child demonstrates unintentional movements, expressions, and vocalizations that are interpretted and treated as meaningful signals by the caretaker (Lasky and Klopp, 1982). These moments of shared attention support the infant's active process of hypothesis building and testing, which lead, as guided by the adult's constant interpretations and affirmations, to the infant's development of a knowledge base (Bruner, 1975).

Early interaction sequences also appear to lead a child to the interpretation of the caretaker's signals; and the development of the intentional signalling of her wants and needs (Lasky and Klopp, 1982). By as young as 10 months, a child may be controlling her nonverbal signals and intentionally communicating through gestures, cries, and any other method available (Dore, 1974; Locke, 1972; Bates, Camaioni & Volterra, 1979).

Much research into early communication has shown that children do, in fact, learn communication and language through natural interactions (joint attention and action routines) and reciprocal turntaking relationships with significant individuals (Bronfenbrenner, 1979; Bruner, 1983). Snyder-McLean, Solomonson, McLean, and Sack (1984) have cited the following dyad (adult-child) interaction characteristics as critical for communication development: a ritualized interaction pattern involving joint action, a unifying theme or goal following a logical sequence, a recognized role played by each participant, and specific response expectancies. Specifically, analysis of the structure of joint attentional and action routines have demonstrated how such nonlinguistic interactions serve to 'scaffold ' the child's early language (Tomasello & Farrar, 1986; Ninio & Ratner, 1978; Ratner & Bruner, 1978). The recurrent nature of these interactions help an infant to determine an adult's attentional focus and therefore, share the intended referent (Tomasello & Farrar, 1986). Tomasello & Farrar (1986) have speculated that the extended periods of joint attention are important because it is during these that the infant is attentive, motivated and best able to determine the meaning of her mother's language. Tomesello & Todd (1983), in their study of joint attention and its relationship to lexical acquisition style, concluded that dyads who did maintain sustained bouts of joint attentional focus had children with larger vocabularies overall.

Turn-taking within the joint routines shared by prelinguistic infants and their significant adults, is considered to be both a prerequiste for learning and a vehicle for learning (MacDonald and Gillette, 1984; Kaye, 1977). The joint routines provide a

structure within which a child can gradually increase her own response repertoires as well as provide the reciprocal interaction patterns necessary for communication development (Snyder-McLean, Solomonson, McLean, and Sack, 1984). It is the dynamic, "give-and-take alternation of conversation and the process of affecting and being affected by the behaviors and communicative acts of another person" (Snyder-McLean, et.al., 1984, p.214.) that facilitate language acquisition.

Bruner (1975) has attached particular importance to the role of games and play as instances of joint attention and action. Early play routines such as peekaboo and other ritualized play with and without objects provide rich grounds for learning about role shifting and sequencing (Bruner, 1975). Bruner has stated that "... play has the effect of drawing the child's attention to communication itself, and to the structure of the acts in which communication is taking place." (Bruner, 1975, p.10). Bruner and Ratner (1978) went further to specify the components of play routines that facilitate language acquisition. They proposed that routines provide a restricted format, a limited yet highly familiar set of semantic elements, and a constrained set of semantic relations. The clear-cut task structure, the predictability of responses and the reversibility of roles in play routines are desireable characteristics in mother-infant interactions. Play routines are amenable to having their constituents varied for both the mother and the infant while retaining the same known structure (Ratner & Bruner, 1978). Bruner (1974) also credits play with providing a context for tension free joint activites in which an infant can practice dealing with the social and physical world.

A particularly important characteristic of play routines are their provision of the opportunity for mastering rules and conventions. Games such as peekaboo, and anticipation such as for tickling in "Round and round the garden', facilitate a child's sense of infraction of rules and when and how to protest such things (Bruner, 1977).

In conclusion, very early social interactions provide not only the basis for communication which will later be in accomplished in linguistic form but provide significant contexts that facilitate children's knowledge of their native language. The language that mothers use in these social contexts is another important factor in language acquistion. It will be discussed next.

Linguistic Environment

In 1977, Newport, Gleitman & Gleitman proposed 'motherese' as a combination of speech and language characteristics adopted by mothers while in conversation with their young infants. Although prior to this, many investigators had reported clusters of characteristics common to mothers' speech and language to their infants, the uniqueness of the motherese proposal was its assignment of a causal role in acquisition. Many observers of dyad interactions have reported similar characteristics in the speech of the mothers. When in conversation with young language-learning children mothers tend to modify their speech to consist of shorter, semantically and syntactically simpler sentences, more redundancies, slower rate and pauses that occur only at phrase end (Broen, 1972; Snow, 1972). The speech used with youngsters is basically devoid of the meaningless

repetitions, interjections, and broken sentences that occur in conversations with adults (Broen, 1972) and expressed through smaller and more concrete vocabularies (Fraser and Roberts, 1975; Ling and Ling, 1974; Snow, 1977). Also, mothers' choices for the initiation of new topics are limited to primarily the "here and now" type (Bloom, Rocissano & Hood, 1976) and particularly the nonverbal context which surrounds them (Harris, Jones, & Grant, 1983).

Other characteristics of mothers' conversational habits that distinguish between conversations with adults and young children have been reported. For example, Chapman and Kohn (1978) have described dyad interaction in which it appears that mothers actively maintain the attention and cooperation of their children even before the children understand the linguistic and social conventions involved in conversations. Specifically, mothers modify their speech to encourage children to take an active part in the verbal or nonverbal interaction, that is, take a turn, and thereby continue the conversation (Scherer & Olswang, 1984). It is the child's ability to produce an utterance which continues a topic and maintains the conversation, as enabled by mothers' interaction modifications, that appears to facilitate language acquisition (Bloom, Rocissano & Hood,1976). Other studies by Bruner (1976) and Garvey (1975) have also suggested that the child's ability to maintain topic is related to the preceeding utterance of the mother. Mothers do indeed alter their speech and language patterns when talking to their children in order to encourage their participation in the conversation and ultimately language learning (Barnes, Gutfreund, Satterly & Wells, 1983; Newport, Gleitman, &

Gleitman, 1977).

A few specific adult strategies have been studied and reported in literature; one such strategy being imitation. Pawlby's (1977) extensive study of imitation with mothers and their infants suggested that the phenomenon of imitation in early infancy establishes a non-verbal communication system between an infant and adult. This strategy is first used by the mother and slowly appears in the actions of the infant, not as a simple matter of maturation but as a result of the mother's intent to communicate during their reciprocal play. An infant comes to imitate her mother through the initial readiness of the mother to imitate her infant (Pawlby, 1977). Mothers seem to have a marked tendency to echo any of their infants' gestures and vocalizations as they occur spontaneously in the baby's repertoire of activities. This is particularly true for anything that can be interpreted as having some communicative significance. It is when these unintentional acts are imitated back to the child as if the child had meant them for a communicative purpose, that the process begins. Babies show pleasure when mothers imitate an action that they have just preformed. This can lead to the child's repetition of the action and eventually a more deliberate imitation of her mother.

Mothers unconsciously set their children up for imitation by squeezing a turn in between children's multiple repetitions or by anticipating something her child is about to do and doing it first. These initial 'planned' instances of imitation suggest that the timing and placing of a mother's actions/imitations is very crucial to establishing the child's imitation. The child's imitation becomes reliable when she realizes and assumes

voluntary control over her actions (Pawlby, 1977).

Another specific adult strategy that has been studied for its relationship to language acquistion is that of expansion (Scherer & Olswang, 1984; Folger & Chapman, 1978; Hovell, Schumaker, & Sherman, 1978). Scherer & Olswang (1984) have defined expansions as utterances which repeat all or part of the child's preceeding utterance with the addition of semantic and syntactic information. Scherer and Olswang (1984) found systematic relationships between mothers' expansions and children's imitations and spontaneous productions of newly acquired semantic relations. Barnes, Gutfreund, Satterly and Wells (1983) found mothers' extentions- their equivalent to expansions- to be significantly associated with measures of gain in the children's mean length of utterance. Cross (1978), based on her findings, hypothesized that expansions may assist in language acquisition. She also suggested (Cross, 1970, 1975) that the frequency of expansions is closely related to child's speech within a restricted period, and that the mother appears to be strongly influenced by the linguistic maturity of the preceeding child utterance. For example, a more telegraphic utterance received significantly more expansions than less telegraphic utterance.

Lasky & Klopp (1982), in a study of parent-child interactions involving both normal and language-disordered children, found the mothers' use of expansions and exact and reduction imitation to be positively correlated to the mean length of utterance, chronological age, and a formal measure of language development of the normal children.

Others have reported results that fail to support a relationship found between

Chapter 3

Rationale and Research Questions

Rationale

As reported in the previous chapters, great significance is being attributed to the roles of the social context and linguistic environment in which an infant develops. It is the joint routines and reciprocal turn-taking that a mother and child participate in that facilitate the child's communication and language acquisition (Bruner, 1975; Snyder-McLean, Solomonson, McLean and Sack, 1984). Initially, it is only within this supportive context, that the child is able to successfully express her intentions (Lasky & Klopp, 1982). Mothers' consistent use of linguisitic strategies such as imitation and expansion provide important feedback and examples for language-developing infants (Pawbly, 1977; Scherer & Olswang, 1984; Barnes, Gutfreund, Satterly, & Wells, 1983).

Within the literature there are many discussions but little data presented concerning the possible relationships that may exist between these various aspects of communication development and environmental influences. Only speculation exists concerning the degree of influence of each on the other, if indeed a direct relationship exists. Many current intervention strategies focus upon establishing reciprocal turn-taking and communication strategies as the means to increasing children's linguistic competencies (MacDonald,

1985 ; Manolson, 1983). These intervention approaches make assumptions that relationships do indeed exist between the interactions of a dyad and the child's linguistic development; and that improvement of one leads to the improvement of the other.

The number of relationships that may exist between each of the previously mentioned factors is extensive. The vast number of questions to be asked indicates the need for exploratory research; research that surveys all possible relationships and identifies the specific areas to be examined in depth in further research.

It is the intent of this research project to examine the nature and extent of relationships that may exist between specific characteristics of expressive language such as lexicon size, content, and pragmatic use in declarative and imperative conditions; mother/child dyad interaction characteristics such as turn length and strategy use; and normative testing results. The population of interest is that of hearing infants assessed to be developing within normal limits in the areas of linguistic, cognitive, and motor development.

Presentation of the specific research questions and operational definitions follow.

Research Questions

Normative information. Normative developmental measures were administered to the

infant members of the dyads and used in the selection and description of the participants. The standardized testing instruments used were:

a) The Sequenced Inventory of Communication Development (S.I.C.D.)- to determine age equivalent scores of expressive and receptive language development

b) The Bayley Scales of Infant Development (Bayley Scales)- to determine age equivalent scores of mental and motor development.

Characteristics of the infants' expressive language were recorded in order to provide descriptive information. The specific characteristics that were observed and calculated, as well as the relevant research questions, are presented as follows.

Lexicon size: a simple count of the number of spontaneous words used by a child during the two hour language sample collected in the home. An utterance was considered to be a word when it was recognized as such by the researcher or intrepreted and confirmed as such by the parent. Phrases such as "What's that?" were treated as grand words (acting as one word in meaning); with each word having no independent meaning, if neither word occurred seperately or in combination with another word.

Type/Token Ratio(T/T R): a numerical representation of the child's expressive lexicon that compares the total number of words spoken and the number of different words spoken by the child. This figure provides a view of vocabulary diversity by expressing a ratio that indicates the child's unique use of particular words in comparison to those used

repetitively.

1.a) Is there a significant relationship between the lexicon size of the children and their Type/Token Ratio (T/T R), scores on the Mental Development Scale of the Bayley (M.D.I.), the receptive scale (S.I.C.D.R.), and expressive scale (S.I.C.D.E.) of the Sequenced Inventory of Communication Development (S.I.C.D.)?

1.b) Is there a significant relationship between the children's chronological age (C.A.) and their lexicon size, T/T R, M.D.I., the Psychomotor Development Scale (P.D.I.) on the Bayley, S.I.C.D.R., and the S.I.C.D.E. scores?

1.c) Is there a significant relationship between the children's T/T R and M.D.I., the P.D.I. on the Bayley, and S.I.C.D.R., and S.I.C.D.E.?

Lexicon Availability and Pragmatic Function. The linguistic and non-linguisitic performances of the infants during the Imperative and Declarative conditions of the Communication Tasks were recorded in order to provide some information regarding their pragmatic language skills. Definitions of the measures utilized, as well as the questions posed about pragmatic functioning follow.

Linguistic response: A response that utilizes a linguistic symbol; be that the specific label of the object in view or desired, or a word used to comment on the object.

Non-linguistic response: A response that does not include the use of a linguistic symbol but utilizes gaze, manipulation of the adult, an action or gesture, as described in Appendix I.

Declarative condition: The purpose of the declarative condition was to measure the children's production of declarative performatives. Declarative performatives were manifested as the children's attempts to inform the listener about some object or event. The condition involved a repetitive task with blocks as a forerunner to the appearance of a new object. [1]

Imperative condition: The purpose of the imperative condition was to measure the children's production of imperative performatives. Imperative performatives were manifested as the children's attempts to get the listener to do something. Objects were held by the experimenter within the child's visual field but out of reach.

2.a) Is there a significant difference between the infant participants' use of linguistic vs. non-linguistic responses, as expressed as a linguistic ratio, during the declarative (L.R.dec) and imperative (L.R.imp) conditions of the Communication Tasks?

2.b) Are there significant relationships between the L.R. (dec) and the L.R. (imp), and C.A., lexicon size, and T/T R?

[1] Procedures were modifications of declarative and imperative communication tasks described by Snyder(1978) and developed during a pilot study by Holdgrafer & Kysela (1984).

Interaction Measures and Communicative Functions. Interaction of the mother/infant dyads was observed and analyzed for several characteristics of turn-taking, communication mode, and comunicative strategies. Definitions of the specific characteristics of interest as well as the pertinent research questions follow.

Turn: A behavior that responds to another person or initiates contact with the person, followed or adjacent to a similar behavior from the responding person. A turn is considered interrupted in any of the following situations:

1. a pause in the turn behavior of five or more seconds
2. three consecutive responses by one member of the dyad without an intervening response from the second member
3. an action or utterance which is socially or linguistically unrelated to the topic of the conversation/interaction

Turn length: The length of a turntaking sequence. The length of the turntaking sequence was determined by counting the number of successive turns chained together without an interrruption. For example, this turntaking sequence consists of five turns:

mother initiates----------child responds (1 turn)

(2 turns)mother responds---------child responds (3 turns)

(4 turns)mother responds---------child responds (5 turns)

Turn-taking sequence: A sequence of socially related behaviors between two participants which are not seperated by the occurrence of more than three consecutive codeable behaviors emitted by one participant. Turntaking sequence can be either mode-matched or non-mode-matched.

Mode-matched sequence: A sequence of turns where the turn of one particpant is not more than one mode removed from the adjacent turn of the second participant (in the mode sequence: action- vocalization-word- phrase). For example: if the first participant utilizes the vocalization mode, the second participant would be recorded as mode matched if she utilizes the action mode or the word mode.

Non-mode-matched sequence: A sequence of turns where the turn of one participant is greater than one mode removed from the adjacent turn of the second participant(in the mode sequence action- vocalization- word- phrase). For example: one participant utilizes the action mode, the second participant utilizes the word mode in response.

Initiation: A novel behavior performed by a child and directed toward the mother and not apparently elicited by the mother's immediately preceding behavior. The adult version of Initiation is Model.

Imitation: The overt repetition of all or part of the partner's immediately previous

behavior or an attempt at a repetition of that behavior. An imitation must occur within 10 seconds of the partner's behavior.

Expansion: A behavior by one partner which includes part or all of the immediately previous behavior of the other partner and adds a topic-related behavior not more than two modes removed from the partner's behavior(for example: the child rolls ball; parent rolls ball & says "ball"). An expansion must occur within 10 seconds of the previous behavior.

3.a) Is there a significant relationship between mean turn length, and C.A., lexicon size, T/T R, L.R. (dec), and L.R. (imp)?

3.b) Is there a significant relationship between the ratio of mode-matched vs. non-mode-matched turns (M.M.R.), and C.A., lexicon size, T/T R, L.R. (dec), L.R. (imp), and mean turn length?

3.c) Is there a significant relationship between the occurrence of child initiation strategy and C.A., lexicon size, and T/T R?

3.d) Is there a significant relationship between the occurrence of the child imitation strategy and C.A., lexicon size, or T/T R ?

3.e) Is there a significant relationship between the occurrence of the maternal expansion strategy and C.A., lexicon size, or T/T R ?

3.f) Are there significant relationships between the maternal Communicative

strategies(imitation and expansion) and the child strategies(imitation and initiation)?

3.g) Are there significant relationships between the Communicative Strategies and the L.R. (dec) and L.R. (imp)?

3.h) Are there significant relationships between use of the Communicative strategies and MTL and M.M.R.?

Chapter 4

Methodology

Participants

Fourteen (14) mother-infant dyads participated in this study. The children ranged in age from fifteen months and fourteen days(15 months-14 days) to nineteen months and six days(19 months-6 days) (see Table 1). Six girls and eight boys participated.

All participants were residents of Edmonton or surrounding communities and were recruited through local advertising and "word-of -mouth". The advertising occurred with the cooperation of a Public Health Unit's "Well Baby Clinics", day-care operators, and local business operators who agreed to post notices. The notices briefly outlined the study and invited any interested families to contact the researcher for further information. Many of the participants were recruited through the referral/suggestion of other participants. Potential participants reported an initial interest in the study based on the opportunity for a hearing test and an evaluation of their child's language development.

Acceptance of interested families was determined by the fulfillment of the following child characteristics:

1. chronological age between fifteen and twenty months
2. age-appropriate performance scores on the Bayley Test of Infant Intelligence (Motor and Mental forms)

TABLE 1

Measures of Linguistic & Cognitive Development

Child	Chronological Age (months-days)	Lexicon Size	Type/Token Ratio	M.D.I. (months)	P.D.I. (months)	S.I.C.D.R. (months)	S.I.C.D.E. (months)
1	16-4	66	.455	18.3	23.0	24	20
2	19-6	88	.682	25.0	25.6	20	20
3	18-11	20	.600	19.0	16.0	16	16
4	17-24	33	.455	18.3	15.0	16	16
5	17-15	9	.556	19.0	18.0	16	16
6	18-24	37	.568	20.5	16.0	20	16
7	15-14	33	.606	21.0	23.0	20	16
8	18-8	10	1.00	19.5	21.0	16	20
9	18-5	85	.435	23.0	23.0	24	20
10	16-2	45	.244	14.5	11.9	16	16
11	17-23	13	.692	19.0	17.0	16	20
12	18-23	31	.710	22.5	22.0	28	20
13	16-27	22	.500	19.0	23.7	16	16
14	16-26	29	.621	18.0	18.0	20	20
Mean	17-18	37.86	.580	19.8	19.5	19	18
S.D.	23 days	25.71	.174	2.6	4.1	3.9	2.1

3. an expressive vocabulary of a minimum of ten words, five being object words

4. a successful audiometric screening

A signed parental release for videotaping and information obtained during the study, and the completion of all aspects of the research within a ten day period were also criteria for inclusion in the study. Based on these requirements, fourteen of the twenty-two potential participating dyads were selected for study.

All fourteen of the participating families had two parents living in the home. Thirteen of the fourteen families were homeowers; the remaining family was renting their home. Thirteen of the fathers were employed full-time outside of the home; the remaining father ran a business from his home. Four of the mothers were employed full-time outside of the home, seven of the mothers were full-time homemakers, and three were employed part-time outside of the home. Ten of the children were the only child in the family; two were the youngest of two preschoolers in the home, and two were from families of three children.

The mothers who participated in the study had educational backgrounds ranging from High School Diplomas to University degrees. Seven mothers had earned High School Diplomas; three held College Diplomas while four had completed University Degrees.

Settings

Data collection occurred in two settings. The language sample and standardized language measures (The Sequenced Inventory of Communication Development) were carried out at the families' homes in an attempt to assess the children in their most natural and comfortable environment. Cognitive skills assessment, as acheived by the administration of the Uzgiris-Hunt Scales and the Bayley Scales of Infant Development, were also completed in the homes but on a different occasion.

The remaining procedures occurred in a laboratory setting that allowed for specialized equipment, videotaping, and control of stimulus materials and activities. The mother-infant interaction sequences as well as the communication tasks were carried out in a laboratory located in the Education building at the University of Alberta. The room was adjacent to a videocamera control room and separated by a one-way mirror that allowed for direct observation and videotaping of the mother-infant dyads. The audiometric screening was accomplished by use of a sound booth and audiometric equipment located in a room adjacent to the laboratory.

Procedures

A few of the initial procedures fulfilled two purposes in the study: that of determining each infant's appropriateness for the study, and collecting data on the infants. The procedures used for subject selection were:

1.) the language sample

2.)the standardized testing(the S.I.C.D., Bayley Scales, and Uzgiris-Hunt Scales)

3.) audiometric testing.

Acceptability was determined by the infant's fulfillment of the entrance criteria listed in the Participants section of this chapter. Procedures to determine this information occurred in three segments. When possible, an attempt was made to complete the segments in this order:

1)the language sample and standardized language measurement;

2)administration of the Uzgiris-Hunt Scales and Bayley Scales;

3)the mother-child interaction session, communication tasks, and audiometric testing.

All 14 families were introduced to the study by the language sample and standardized testing completed at home. The order of the remaining two phases was achieved with 7 of the 14 families Exceptions to this occurred because of scheduling conflicts such as the childrens' nap times or availability of the laboratory. Since the three segments were exclusive to each other, the preferred order was not neccessary for data collection. The attempt to achieve the order was solely for the purpose of eliminating non-qualifying families as soon as possible.

Language Sample and Standardized Language Measurement. The purpose of the in-home language sample and standardized language measure was to collect a representative record of the child's expressive language and lexicon, and provide a formal

record of expressive and receptive language development(see Table 1). These were collected and administered by a Speech-Language Pathologist during one visit to the families' homes. The language sample was collected during the first two hours of the childrens' day. In this way, the samples all included the children eating (breakfast), dressing, and playing, as well as the potential conversation/comments that occur during these periods. In most cases the researcher accompanied the mother when she went into the child's bedroom to get him/her up for the day.

The number of family members present during the language sample varied from family to family dependent on the father's work schedule and the presence of siblings. Four of the fathers were present for all or part of the language sample collection; siblings were present in three cases. The parent(s) were prepared for this segment with the instructions to carry on as normally as possible. The mothers were instructed to follow their daily routine such as housework and to interact with the child as usual. The mothers were informed that the researcher would follow the child around and record (in writing) everything the child said during the two hour time period. If, because of poor intelligibility, the researcher required the interpretation or confirmation of a child's utterance, it would be requested.

During the sample collection, the researcher did not attempt to interact with the child. If, however, the child initiated conversation or play, the researcher responded. Utterances were recorded by handwriting; no electronic devices were used as they were deemed inappropriate/unfeasible because of the children's great mobility throughout the

houses, the poor intelligibility of the children's speech, and the relatively slow/infrequent rate of utterances that enabled very easy live transcription. All of the child's (confirmed) utterances were recorded regardless of whom they were addressed to. Only utterances that were intelligible to the researcher and/or definitely identified as words by the mother were recorded.

The recording of each utterance was accompanied by some limited information on its function; one of four categories of conversational function was recorded with most utterances. The researcher chose from 4 possible functions: a response to a question; a spontaneous (non-prompted) imitation; a solicited (prompted) imitation; or an apparently spontaneous utterance. This information was intended for later use in determining spontaneous lexicon size.

The Sequenced Inventory of Communication Development (SICD) (Hedrick et al.,1984) was used to establish a standardized language measure of the children's receptive and expressive language and was administered immediately following the two hour language sample.

Information is collected for the SICD in two ways: by direct observation of the child when he/she is presented with various situations/objects and by parent report. Parent report allows for inclusion of behavior/ information that is not observed during the test either because of the situation inappropriateness (such as spontaneous response to a familiar person's arrival) or reluctance due to the child's age or comfort level. Information gathered by direct observation is elicited through object manipulation,

questions, and play. Information provided by parental report is gathered by questions, particularly requests for specific examples of the child's communication skills and habits. Compiled information is calculated and expressed as a Receptive Communication Age (RCA) and as an Expressive Communication Age (ECA).

Measures of Infant Cognitive Development. Measurements of these two skill areas were administered over one, two, or in a few cases three visits to the home. The number of visits was determined by the infants' willingness/tolerance for participation and cooperation with the tasks. Administration of these measures was completed by an individual trained specifically for these measures by a Clinical Psychologist.

The Bayley Scales of Infant Development (Bayley,1969) were utilized for the measurement of developmental progress of the infants (see Table 1). The Uzgiris-Hunt (1975) Ordinal Scales of Psychological Development were utilized as an Pigetian-based assessment of cognitive skills (see Table 2).

The Bayley Scales of Infant Development (Bayley, 1969) were designed to provide an evaluation of a child's developmental status during the first two and one-half years of life. The instrument attempts to accomplish this by using a tripartite approach that provides complimentary information about the child. The three part evaluation consists of: the Mental Scale; the Motor Scale; and the Infant Behavior Record. This study only utilized the Mental and Motor Scales.

The Mental Scale is designed to assess sensory-perceptual activities, discriminations,

TABLE 2

Child Scores on the Ordinal Scales of Psychological Development (Uzgiris-Hunt, 1975)

Child	Chronological Age (months-days)	Object Permanence Stage Achieved	Means Ends	Vocal Imitation	Gestural Imitation	Operational Causality	Spatial Relations
1	16-4	6	5	6	6	6	6
2	19-6	6	6	6	6	6	6
3	18-11	6	6	6	5	6	6
4	17-24	6	6	5	6	5	6
5	17-15	5	5	5	5	6	6
6	18-24	6	6	5	5	5	6
7	15-14	5	6	5	5	6	6
8	18-8	6	6	5	5	6	6
9	18-5	6	6	6	5	6	6
10	16-2	4	5	6	5	6	6
11	17-23	6	5	6	5	5	6
12	18-23	6	6	6	5	6	6
13	16-27	5	5	5	5	6	6
14	16-26	6	5	5	6	5	6

and the ability to respond to these. It evaluates the early acquistion of "object constancy' and memory, and learning and problem solving ability. The scale notes the existence of vocalizations, signs of early verbal communications, and the ability to form generations and classifications. Results of the administration of the Mental Scale are expressed as a standard score, the MDI or Mental Development Index.

The Motor Scale is designed to provide a measure of the degree of control of the body, coordination of the large muscles, and finer manipulation skills of the hands and fingers. Results of the administration of the Motor Scale are expressed as a standard score, the PDI or Psychomotor Development Index.

Uzgiris and Hunt's (1975) Ordinal Scales of Psychological Development were developed in order to provide an alternative to the traditional assessment of psychological development in infancy. Based on Piaget's and Hunt's(1961) findings of hierarchical organization in the development of intelligence and motivation, the Ordinal Scales assess sequences believed to be progressive levels of organization realized in the development of intelligence and motivation. The Scales assess six branches of psychological development: The development of visual pursuit and the permanence of objects, the development of means for obtaining desired environmental events, the development of imitation (vocal and gestural), the development of operational causality, the construction of object relations in space, and the development of schemes for relating to objects.

The results of the administration of the Ordinal Scales are reported by level or stage achieved. No standardized testing has been reported to allow for estimates of

developmental age based on the Scales.

Mother-Infant Interaction. The mother and child interaction sequences were carried out at a laboratory located in the Education building at the University of Alberta. The room was adjacent to a videocamera control room and separated by a one-way mirror that allowed for direct observation and videotaping of the mother-infant dyads. The four remote-control cameras were set-up such that two were mobile, providing good coverage of the interactions. All four cameras were capable of wide-angle and zoom functions. The ability to switch between cameras allowed for previewing and choosing of "the best shot".

The laboratory was 5 meters by 5 meters but was often decreased by the creation of a barrier made of chairs. This barrier helped to keep active children from running around the room. A blanket was spread out in the center of the room and acted as a focal point for the interaction segments.

The purpose of the mother-infant interaction sequences was to collect and record eight (8) minutes of interaction. Ideally this was comprised of four - 2 minute segments. Recording of this interaction was accomplished by videotaping the mother and infant's play with 5 or 6 toys for a time period of two minutes each. This potential 10 or 12 minutes of taping allowed for the child's lack of interest or refusal to play with one or two of the target toys for the full 2 minute segments. Descriptions of the 6 toys are listed in Appendix A.

The interaction segments were introduced in such a way as to encourage a display of

the mother and infant taking turns with toys, play, and conversation in general. Instructions were explicit in regards to turn-taking being an objective of the session. Prior to the interaction sequences, each mother was given a cursory explanation of the purpose of the interaction segment and the researcher's expectations of the dyad. The mother was requested to attempt to keep the interaction to the area outlined by a blanket spread out in center of the room. The explanation/instructions were presented orally and are listed as Appendix B.

Prior to each two-minute segment, the researcher presented a toy along with specific instruction and demonstration of how to play with the toy. The researcher then left the room to observe from the adjacent room. Specific toy instructions are listed as Appendix C.

Interaction with individual toys was terminated if/when the child left the blanket three times or if the child was out of camera range for more than ten seconds. The toy was then replaced by another.

Communication Tasks. The administration of the Communication Tasks followed the Mother-Infant Interaction sequences. The time lapse between these two segments was often less than ten minutes depending upon the mother's estimate of the child's need for a break or for quick movement to the next segment.

The Communication Tasks were carried out in the same room as the interaction sequences and were similiarly videotaped. The mother, with her child upon her lap, was

seated across a table from the researcher. The table was kept clear except for objects being used during various parts of the Communication Tasks .

The purpose of the Communication Tasks was to measure and electronically record each child's production of imperative and declarative performatives (linguistic and non-linguistic) in response to test situations. Five items whose labels were represented in the child's spontaneous expressive lexicon (as observed during the language sample and/or reported by the mother) were involved. The items were presented in such a way as to provide opportunity for declarative and imperative use. The two tasks were always presented in the same sequence for each word.

Declarative condition. An opaque nylon drawstring bag (10 inches X 14 inches) was used to hide three blocks and the target item. The nylon bag was placed on the table within easy reach of the child who was encouraged to look into the bag and pull something out. The researcher's hand was placed so that only one object at a time could be pulled from the bag.

The first three objects drawn out by the child were always three identical wooden blocks, with the fourth being the target item. Upon labeling or the passing of 20 seconds, the item was removed from the child's reach but left within view.

Imperative condition 1. The target item was out of reach but within view for 20 seconds or until the infant said the label.

Imperative condition 2. The item was placed in clear sealed cannister and handed to the child. The child again had 20 seconds during which to produce the label. When 20

seconds had elapsed, regardless of her behavior toward the item, the child was momentarily allowed to play with the toy or eat/drink it in the case of an edible object. (The second imperative condition was presented only if no verbal labeling occurred in Imperative 1.)

This procedure of hiding the blocks and target item was repeated for each of the 5 items. The items were ordered from what was judged to be of least interest to greatest interest. As a general rule, edible items were presented last.

Prior to the Communication Tasks each mother was prepared for the tasks with brief statement of purpose and instructions. These are listed as Appendix D.

Audiological screening

Audiological screening occurred immediately following Communication Tasks or as soon as possible if the mother judged that the child needed a break before cooperation could be achieved again. The laboratory containing the sound booth and audiological equipment was located in a room adjacent to the videotaping facilities. The mother and child were placed in the sound booth so that both members of the dyad and the researcher could view each other through the sound booth window. Sound field testing was employed utilizing speech reception and pure tone detection methods. Twenty (20) decibels was chosen as the screening level intensity. Pure tones of 500, 1,000 , 2,000 , and 4,000 Hertz were administered.

A Madsen OB-822 Audiometer and an Allison 2500 Sound Field System were used

within an audiometric sound suite(Industrial Acoutics Co., Inc.) 2 meters by 2 meters. The equipment was callibrated two weeks prior to the testing of the first subject.

Interaction Analysis

Mother-Child Interaction. The mother-child interaction sequences were recorded on video-tape to allow for later coding and analysis. From the recorded sequences, four - 2 minutes segments were chosen for analysis. Of the 6 possible segments with each dyad (6 toys), the following general guidelines were used to determine the four segments choosen for coding. If all 6 toys resulted in full 2 - minute segments, interaction with the second, third, fourth and fifth toys were coded. Elimination of the first and last toy was intended to reduce any possible effects of 'warming up' to the situation or fatique with the task. If only 5 of the toys elicited full 2 minute segments, the last four toys were coded.

In cases where more than 2 minutes were taped with a particular toy, the middle-most 2 minutes were selected from the tape. Often the abovementioned decisions were not necessary because the child failed to interact for a sufficient length of time with all 6 of the toys.

In several cases, the child did not interact for a sufficient length of time with four toys. In these situations, two minute segments were achieved by combining interaction time taped with two separate toys. For example, one subject interacted with the second, third , and fourth toys for the full 2 -minute segments. Her play with the sixth toy was

not usable. The middle-most 1-minute segments from her interaction with the first toy and the fifth toy were combined to provide the fourth 2-minute segment. In one case, the child only interacted with 3 toys; and the 8 minutes were achieved during her play with those 3 toys.

The videotaped interaction provided records of the dyads' interactions which were analyzed in two ways. One method utilized a revised version of the Preschool Observation System (Kysela and Barros, 1983) and allowed for documentation of the behaviors of the both members of the dyad. The observed behaviors were categorized into five types: Initiate, Respond, Imitate, Signal, and Guidance. Each behavior was also characterized by its mode of communication: motor-gestural, vocalization, single word, or phrase. Definitions of these behavioral categories and modes are listed in Appendix E.

The interaction was documented manually from videotape by observers using prepared data sheets for the recording of maternal and infant behavior categories and modes. An example of the data sheet is presented as Appendix F.

Each data (coding) sheet consisted of two columns: one for recording the parental behaviors and the other for the child's behaviors. Color coding of the columns provided easy differentiation between the two. Each column was divided into nine blocks representing the nine categories of behavior (R= Respond, I = Imitate, etc.). Recording of the observation of each behavior was accomplished by marking the appropriate block with a slash. In order to document the passage of time with no interaction, a horizontal line was drawn across both columns when no interactive behaviors occurred for a ten second

interval. To indicate a temporal sequence, behaviors were scored progressively downward on the form. Simultaneous behaviors were scored on the same line.

Communication Strategies. The second method of behavior analysis examined the communicative strategies used by the dyads. The strategies and their definitions are listed in Appendix G. Analysis was accomplished by review of the interaction videotapes and use of a system devised for the study. Analysis was completed by the two individuals who had devised the system. The observers recorded the each occurrence of the communicative strategies.

Appendix H provides an examples of the form used for the strategies analysis (Strategies Score Form). The form consisted of two sets of six columns to accomodate a maximum of six toys used. One set of columns allowed for recording of the mother's strategies (the upper set); the second set for the child's strategies (the lower set). Each column contained 8 blocks representing the 8 strategies.

Communication Tasks. The Communication Tasks were videotaped and scored later. The scoring was based on a scale devised by Sugarman (1973), revised by Snyder (1978), and expanded by in this study to include a distinction between specific label production and related word production. This seven point scale (Appendix I) describes the child's communicative/social interaction with the participating adults and documents the child's range of interaction from non-interactive (scored as 1) to correct labeling of the target object (scored as 7). The scoring form is presented as Appendix J.

Observer Training and Reliability

Mother - Child Interaction. Two observers analyzed the dyad interaction by utilizing the Preschool Observation Record (Appendix E). One of the observers had previous, extensive experience with the analysis system from the study that had originally devised and used it. The experienced observer taught the new observer the basic system by reviewing examples of each behavioral category, and by facilitating recognition and association of each with the appropriate definitions and terms (categories). Independent practice occurred while observing and scoring videotapes of dyads not accepted for the study.

A minimum criterion of 80% agreement (mean reliability) between the two observers, over five consecutive two-minute segments, was required before actual scoring of participant tapes began. Reliability scores were calculated by dividing the number of agreements by the total number of agreements plus disagreements in each two minute segments. Reliability figures were obtained approximately half-way through the scoring of the tapes and at the end of scoring. Reliability ranged from 78% to 89% over the course of scoring. The overall mean of 82.3% was achieved. Table 3 presents the observer reliability scores.

Communicative Strategies. Observer's scoring and reliability were also evaluated for

TABLE 3

Calculations of Reliability

	Beginning		Middle		End		Overall
	Range	Mean	Range	Mean	Range	Mean	Mean
Preschool Observation Record	78-86%	80.2%	79-87%	82.8%	79-89%	84%	82.3%
Communication Strategies	77-100%	84.6%	80-100%	96.1%	77-100%	89%	89.9%
Communication Tasks	92-100%	94.8%	85-92%	88.1%	92-93%	92.6%	91.8%

the communicative strategies (Appendix G)used by the dyads. Analysis was completed by the researcher and another graduate student also using the Strategies scoring procedures in a similar study (McCarthy, 1986). The procedures had been created specifically for use in the two studies by the two observers so familiarity with the scoring system was extremely high. Actual scoring of the participants' strategies began when the observers had reached a reliability agreement of a minimum of 80% on segments containing at least 8 occurrences of strategies during the two-minute segments.

Reliability scoring employed a ten-second time sampling method. The observers recorded the communicative strategies occurring at the instants of each of the ten-second markers. The ten- second intervals in the two minute segments allowed for a maximum of twelve instances of strategies between the dyads. Twelve strategies were not always recorded due to inactivity at the moment of recording. This time sampling procedure was utilized in order to insure that the two observers were scoring the same behaviors. The videotapes of families not accepted for the study were used for practice and establishing reliability.

Reliability was calculated by dividing the number of agreements by the total agreements and disagreements in a two-minute segment. Reliability checks were done on randomly selected children at approximately half-way through the scoring of the tapes and during the final few. Over the course of the scoring observer reliability ranged from 77% to 100% with a mean of 89.9% (see Table 3).

Communication Tasks. In preparation for the scoring of the communication tasks, two

observers learned the scoring method by viewing communication task videotapes of potential participants not accepted for the study. Examples of each of the scoring categories were viewed and the associated definition explained by the researchers. The two observers began scoring the videotapes of participants when their reliability scores reached a minimum of 80%. Reliability calculations were established by scoring a minimum of 2 children's tapes for a minimum of thirty scoreable items. Reliability ranged from 85% to 100% with an overall mean of 92.6%. Table 3 presents the observer reliability scores.

Internal and External Validity

Internal and external validity and possible threats to these will be discussed from the perspective of descriptive studies.

Internal validity refers to the extent to which "extraneous influences have not contaminated or confounded the results that show differences or relationships" (Ventry & Schiavetti, 1986, p.75). External validity refers to the extent to which the results of a study can be generalized to other subjects, other settings, other measurements and other treatments (Ventry & Schiavetti, 1986). While both internal and external validity are important considerations for the generalization of findings, they can, by nature of the design of the research, work against each other. For example, a rigidly controlled laboratory experiment can provide strong internal validity with only questionable external validity. A balance between internal and external validity must be struck and

met by the experimental design of the research. Descriptive studies, by their nature, obtain observations without manipulation of independent variables by the researcher (Ventry & Schiavetti, 1986). In descriptive studies, researchers attempt to be passive observers whose presence, along with that of their instruments or techniques, "cause a minimum of alteration of the naturalness of the phenomena under investigation" (Ventry & Schiavetti, 1986, p.49).

Study Design. The design utilized in this research was that of a particular type of descriptive study; a pre-experimental case study repeated over multiple subjects. Case studies have traditionally consisted of the intensive investigation of an individual, often relying heavily on detailed descriptions and observations (Kazdin, 1982). Pre-experimental designs refer to studies that do not entirely rule out extraneous factors and have usefulness in leading to specific true experiments (Kazdin, 1982). "Case studies lay the groundwork for future research that will use larger groups by identifying variables that can or should be experimentally manipulated and by generating hypotheses that need to be tested" (Ventry & Schiavetti, 1986, p.300).

The range of control existing in case studies varies greatly depending upon the type of data and method of data collection. Anecdotal information and objective information such as direct measurement of overt behavior represent the extremes of the spectrum in data types. In this instance of multiple case studies, data were collected by placing the participants in several observational situations in which the researcher's amount of

involvement with the dyad varied.

Threats to Internal Validity. Extraneous variables that may alter the results of a study if they are not eliminated or minimized are considered to be threats to internal validity (Ventry & Schiavetti, 1986). The extent to which each threat can be ruled out or shown as implausible determines the internal validity (Kazdin, 1982). The possible threats as viewed by Kazdin (1980) and Cook & Campbell (1979) are listed and discussed in relation to this non-intervention study.

History refers to the possiblity of any other event occurring during a study that could influence the results or account for the pattern of data collected. This threat is most powerful in an intervention study that is ongoing over a period of time. The maximum ten-day time-span of the various phases of this study and the one-time nature of the study make such an influence unlikely.

Maturation refers to any changes that occur within the subjects themselves during the duration of the experiment. This includes the physical and mental maturation of infant development and health, etc. The brevity of the time span involved in this study and the non-repetition of experimental situations strongly protect against maturation as an internal threat.

Testing can function as a threat when a change in performance may be accounted for by repeated testing and possible learning. Statistical regression refers to any change from one assessment occasion to another as an incidence of regression to mean. The inclusion of

groups of subjects based on extreme scores on pre-experimental testing is particularly prone to regression to the mean. The non-repetition of experimental situations negates these threats.

Instrumentation refers any change in a measuring instrument or assessment procedure during the course of a study. Human observation and judgement of behavior are a specific example. Kratochwill (1978) views the reliablity of data collection done by human observation and judgement as presenting a particular threat. The use of videotape equipment to record most phases of this study and thereby provide the observers with the option to review behaviors, made accurate recording likely. The use of two independent observers and regular monitoring of their agreement and reliability occurred to ensure against observer drift. Detailed description of how reliability was calculated and the reliabilty records are provided in the Observer Training and Reliability section of this chapter.

Threats to External Validity. Threats to external validity are characteristics of a research study that may limit the generality of the results (Kazdin, 1982). The nature and purpose of descriptive studies are such that generalization of results is not a primary goal. Despite this, it is still important to be aware of where potential restrictions exist.

Virtually any characteristic of a study can limit the extension of its findings, but a few obvious threats can be identified categorically. Kazdin (1982) and Ventry & Schlavetti (1986) have identified several.

Generality across subjects refers to the limit that results can be extended to others. Specific characteristics of subjects such as age range, intelligence, etc. may limit this extension to other populations. It is recognized that the limited ranges of socio-economic status and parental education levels represented by this participant group have created a very congruent group for these characteristics. Also, subject selection of this study excluded infants considered to have normally developing cognitive and linguistic skills but lacking the required expressive lexicon. The result of this entrance criterion has been a subject group with larger expressive lexicon than possibly could be expected in the general population.

Generality across settings, responses, and time present other potential threats to the external validity of research. The degree to which any of these factors influenced the outcome of this study could determine the reliability of its results. Attempts were made to put the participants at ease by providing physically comfortable and familiar surroundings. This goal was actualized by initally meeting the participants in their own homes and carrying out the first phases of the study there. When the families arrived at the University laboratory for the Interaction and Communication phases of the study, the children were given a few minutes to explore the surroundings.

Only one phase of the study was standardized for time of the day; that was the early morning language sample which occurred during the first two hours of each child's day. This standardization was an attempt to observe similar activities and potential conversations between the dyads. The timing of the other phases of the study were carried

out so as not to occur during or directly prior to a nap or meal time. Theoretically, hunger or tiredness as causes for possible poor cooperation were reduced.

Reactive assessment refers to the extent to which participants are aware that they are being assessed or observed and the extent to which this awareness influences the way the participants behave or respond. Such a threat was a very real possibility for the mothers in this study. Attempts to make the mothers comfortable and perhaps more natural included initially meeting the families in their homes and preceeding each section with a brief explanation of the researcher's expectations.

Chapter 5 will present the results of the study. Chapter 6 will discuss the results.

Chapter 5

Results

The results of this study are presented in the same order as the research questions in Chapter 3.

The exploratory nature of this study dictated the choice of statistical analysis. In almost all cases, correlation was chosen as the appropriate statistic because of its description of the degree or magnitude of the relation between the data sets in question.

A correlation matrix was employed to calculate all possible correlations and present significant relationships. The Pearson product-moment correlation coefficient was utilized for a two-tailed test ($p < .05$); a critical value of .532 (N= 14, 12 degrees of freedom) was used.

Normative Measures

Research Question #1a. Is there a significant relationship between the lexicon size of the children and their Type/Token Ratio (T/T R), scores on the Mental Developmental Inventory of the Bayley (M.D.I.), the receptive scale (S.I.C.D.R.), and expressive scale (S.I.C.D.E.) of the Sequenced Inventory of Communication Development?

The number of spontaneous words spoken by the children during the two-hour

language samples were totaled and reported as the lexicon size. This count of lexicon size was chosen as a descriptive measure of the children's expressive language. A correlation was calculated in order to determine the relationship of lexicon size to Type/ Token Ratio, another measure of expressive language, which compared the number of different words spoken (Type) to the total number of words spoken (Token). The correlation between lexicon size and Type/Token Ratio was nonsignificant, as reported in Table 4.

In order to probe for the existence of any relationships with formal measures of cognitive and linguistic development, lexicon size was also correlated with the subscales of the Bayley Scales of Infant Development (the Mental Development Index-MDI and the Psychomotor Development Index-PDI), and the Sequenced Inventory of Communication Development (Receptive Communication Age-S.I.C.D.R. and Expressive Communication Age-S.I.C.D.E.). No significant relationships were found (see Table 4).

Research Question # 1b. Is there a significant relationship between the children's chronological age (C.A.) and their Lexicon size, T/T R, M.D.I., and the P.D.I. on the Bayley, and their S.I.C.D.R. and S.I.C.D.E.?

The children's chronological age was examined in relationship to the two descriptive expressive language measures. Neither lexicon size nor Type/Token Ratio were found to be significantly related to age. The formal measures of language development (S.I.C.D.R. and S.I.C.D.E.), as well as the formal measure of psychomotor development (P.D.I.) were also not signficantly related.

TABLE 4

Correlations among Child Linguistic Measures

Measures	1.	2.	3.	4.	5.	6.	7.
1. Chronological Age	-	.2130	.4226	.6125	.1128	.1553	.3179
2. Lexicon size		-	-.3864	.4618	.4033	.5142	.3344
3. Type/Token Ratio			-	.4117	.3469	.0018	.4555
4. Mental Development Index (M.D.I.)				-	.7286**	.5331*	.4059
5. Psychomotor Development Index (P.D.I.)					-	.5052	.4757
6. Sequenced Inventory of Communication Development Receptive Scale (S.C.I.D.R.)						-	.5322*
7. Sequenced Inventory of Communication Development Expressive Scale (S.I.C.D.E.)							-

Note: *$p < .05$ **$p < .01$

However, the correlation between chronological age and scores on the Mental Developmental Index of the Bayley Scales was found to be significant (see Table 4 for the specific figures).

Research Question # 1c. Is there a significant relationship between the children's T/T R and M.D.I., P.D.I., their S.I.C.D.R., and S.I.C.D.E. ?

The relationships between Type/Token Ratio, the descriptive measure of children's repetitive use of words, and all of the formal measures of cognitive and linguistic development were examined through correlation and found to be nonsignificant. Correlation figures are reported in Table 4.

Availability and pragmatic function of early lexicon .

Research Question # 2a. Is there a significant difference between the infant participants' use of linguistic vs. non-linguistic responses, as expressed as a linguistic ratio, during the declarative (L.R.dec) and the imperative (L.R.imp)conditions of the Communication Tasks?

A ratio of the number of linguistic to non-linguisitic responses used by the children during the Communication Tasks was calculated for the Imperative (L.R.imp) and Declarative (L.R.dec) conditions. The mean ratios were .400 and .600 respectively. In order to determine if the children utilized more linguistic responses in one condition as

osed to the other, Lingusitic Ratios were compared for statistically significant differences. A t-test was used for correlated samples. With a sample size of 14 (df=13), the critical values for significance were 1.771 (p< .1) and 2.160 (p< .05). The resulting t-value was 2.15 and failed to reach significance at the .05 level. The p-value for this difference in fact was .051 .

Research Question # 2b. Are there significant relationships between the L.R. (dec) and the L.R. (imp), and C.A., lexicon size, T/T R?

The relationships that exist between the Linguistic Ratios and lexicon size and Type/Token Ratio, the descriptive expressive language measures, were explored through correlation. L.R. (dec) was significantly related to lexicon size, but not to Type/Token Ratio. L.R. (imp) was not significantly related to either lexicon size or Type/Token Ratio. No significant relationships were found between the Linguistics Ratios and the children's chronological ages. Correlation figures are reported in Table 5.

Interaction measures and communicative functions

Research Question # 3a. Is there a significant relationship between mean turn length (dyad), and C.A., lexicon size, T/T R, L.R. (dec) and L.R. (imp)?

Mean turn length was determined by averaging the lengths of each dyad's turn sequences, as observed during the Interaction segment (8 minutes of play). The group

TABLE 5

Correlations among Child Linguistic Measures & Dyad Interaction Measures

Measures	1.	2.	3.	4.	5.	6.	7.
1. Chronological Age	-	.2130	.4226	.0950	.3394	.4731	.6506*
2. Lexicon size		-	-.3864	.4701	.5860*	.0276	.3820
3. Type/Token Ratio			-	-.0107	-.2170	.2066	.4154
4. Linguistic Ratio Imperative (L.R.imp.)				-	.4062	-.2074	.0401
5. Linguistic Ratio Declarative (L.R.dec.)					-	.0307	.2696
6. Mean Turn Length (MTL)						-	.2603
7. Mode Matched Ratio (MMR)							-

Note: *$p < .05$

mean and standard deviation of the mean turn length were 8.59 and 5.22 respectively.

The ability of a dyad to maintain a topic of conversation or play over extended turns, as represented by the mean turn length was queried in relationship to other characteristics of the dyad and its members. Correlations to other characteristics and measures such as chronological age, lexicon size, Type/Token Ratio, and Linguistic Ratios proved to be nonsignificant (see Table 5). Turn length, as measured in this study, does not appear to be associated with children's word use as characterized by the expressive language measures in this study.

Research Question # 3b . Is there a significant relationship between the ratio of mode-matched vs. non-mode-matched turns (M.M.R.), and C.A., lexicon size, T/T R, L.R. (dec), L.R. (imp), and mean turn length?

The dyad's use of mode-matched turns as opposed to non-mode-matched turns was determined according to definitions found in Chapter 3. A turn that followed another utilizing a similar communication mode or a mode defined as only one step more complicated or simpler, was deemed mode-matched. A turn that occurred in a communication mode more than one step away from the previous turn was labelled non-mode-matched. The group mean and standard deviation for mode-matched vs. non-mode-matched turns (M.M.R.) were .285 and .108 respectively.

The ratio of the occurrence of mode-matched turns vs. non-mode-matched turns utilized by the dyads was investigated as a possible significant characteristic of the dyads'

interaction habits. Calculation of correlations revealed a significant relationship between the mode-matched vs. non-mode-matched ratio(M.M.R.) and chronological age. Older children and their mothers experienced more mode-matched turn exchanges than younger children and their mothers. The correlations between M.M.R. and lexicon, T/T R, L.R. (dec), L.R. (imp), and mean turn length were nonsignificant. See Table 5 for specific correlations.

Research Question # 3c. Is there a significant relationship between the occurrence of child initiation strategy and C.A., lexicon size, and T/T R?

The Interaction segment of this study was videotaped and analyzed for two purposes; the second purpose being the analysis of communication strategies utilized by each member of the dyad. Children were recorded as using the Initiation strategy when they began a new topic of conversation or play. The frequency of occurrence of initiation was queried as to its relationship to the children's age, and use of words as measured by lexicon size, and Type/Token Ratio. Application of correlation calculations indicated a significant relationship between the children's initiation strategy and chronological age. The measures of word use were not significantly related. Table 6 presents the correlations.

Research Question # 3d. Is there a significant relationship between the occurrence of the child imitation strategy (frequency) and C.A., lexicon size, or T/T R ?

TABLE 6

Correlations among Child Linguistic Measures & Dyad Communication Strategies

Measures	1.	2.	3.	4.	5.	6.	7.
1. Chronological Age (C.A.)	-	.2130	.4226	.7111**	-.1180	.0788	.5143
2. Lexicon size		-	-.3864	-.0477	.4132	.2344	.4500
3. Type/Token Ratio			-	.5232	-.1182	-.0414	.2912
4. Initiation Strategy - Child				-	-.1149	-.1031	.5173
5. Imitation Strategy - Child					-	.6033*	.2551
6. Imitation Strategy - Mother						-	-.0405
7. Expansion Strategy Mother							-

Note: *$p < .05$ **$p < .01$

Analysis of the Interaction segment resulted in frequency of occurrence totals for imitation strategies as used by the children. Imitation strategy is defined in Appendix G as one member's repetition of an action, vocalization, word, or phrase by the other. Correlation was used to explore the possiblity that the use of imitation was related to the children's age or word use. No significant correlations were found suggesting that these characteristics reflected different skills within the children's linguistic development.

Research Question # 3e. Is there a significant relationship between the occurrence of the maternal expansion strategy and C.A., lexicon size, and T/T R?

Mothers' were credited for the use of expansions during the Communication Tasks when they repeated the child's action, vocalization, word, or phrase and added something relevant to that imitation (refer to Appendix G for formal definitions). The frequency of maternal use of the expansion strategy was accrued and then examined in relationship to the children's age and word use habits. Correlations indicated that there were no significant relationships between the frequency of mothers' expansions and the number of words and word repetitions children use at this early stage of linguistic development. Table 6 presents the correlation figures.

Research Question #3f. Are there significant relationships between the maternal Communicative strategies (imitation and expansion) and the child strategies (imitation and initiation)?

The relationship between each member of the dyad's use of strategies was queried. When the children's use of the imitation strategy was correlated with that of the mothers' use of imitation, a strong correlation was found. Mothers who demonstrated high frequencies of imitation had children whose frequency of imitation was also high.

An interest in the relationship between mother's use of expansions and children's use of imitation was spurred by the conflicting findings reported in the literature. Scherer & Olswang (1984) found systematic relationships between these two strategies while Cazden (1965) did not. This study also failed to obtain a significant relationship between mothers' frequency of expansions and children's frequency of imitations.

Correlations between the children's use of initiation and mothers' use of imitation and expansion were nonsignificant (see Table 6).

Research Question #3g. Are there significant relationships between the Communicative Strategies and the L.R. (dec) and L.R. (imp)?

The children's use of the imitation strategy was significantly correlated with L.R. (imp) but not with L.R. (dec). None of the other communicative strategies were significantly correlated with the Linguistic Ratios (see Table 7).

Research Question #3h. Are there significant relationships between use of the Communicative strategies and MTL and M.M.R., the Turn-taking measures?

The relationships that were found to be significantly correlated were those between

TABLE 7

Correlations among Dyad Communication Strategies & Interaction Measures

Measures	1.	2.	3.	4.	5.	6.	7.	8.
1. Initiation Strategy - Child	-	-.1149	-.1031	.5173	-.2631	.0880	.7578*	.7578**
2. Imitation Strategy - Child		-	.6033*	.2551	.5901*	.4682	-.2990	.1678
3. Imitation Strategy - Mother			-	-.0405	.3533	.4090	.0255	-.0338
4. Expansion Strategy Mother				-	.1344	.3954	.2064	.9259***
5. Linguistic Ratio Imperative (L.R.imp.)					-	.4062	-.2074	.0401
6. Linguistic Ratio Declarative (L.R.dec.)						-	.0307	.2696
7. Mean Turn Length (MTL)							-	.2603
8. Mode Matched Ratio (MMR)								-

Note: *$p < .05$ **$p < .01$ ***$p < .001$

M.M.R. and child's use of initiation strategy, and M.M.R. and mother's use of expansions. The other communicative strategies were not significant related to either of the Turn-taking measures (see Table 7).

Chapter 6

Discussion

This chapter will discuss the findings of the study with respect to similar research and the specific features of this methodology. Possible explanations for the results obtained for the research questions will be discussed. Additionally, post-hoc relationships will be presented. The possible implications of the findings with regard to intervention will also be addressed. The exploratory nature of this research, however, must be stressed. The scope and intentions of the research design and questions, as well as the sample size and method of data analysis, are such that no definitive conclusions will be offered. The intent of this survey study was to provide directions for further study.

Normative Developmental & Linguistic Measures

Analysis of lexicon size as correlated with the normative linguistic and cognitive measures failed to reveal any significant relationships. Intuitively, this lack of relationship is puzzling. Lexicon size would appear to be a very central component of a child's expressive language acquisition and as such should correspond with receptive and expressive language development. The breakdown in this logic may be a result of the nature of the measurement instrument itself, that is, the Sequenced Inventory of

Communication Development (S.I.C.D.), and the limited age range of the children (15 months-14 days to 19 months-6 days). The Receptive and Expressive Scales of the S.I.C.D. confirmed the children as having communication abilities (ages) similar to their chronological ages, however, little variation of scores between children was found with this measure (see Table 1). For example, two children (# 5 & #10) had Receptive and Expressive Communication Ages of 16 months each, but had significantly different lexicon sizes of 9 and 45 words respectively.

The S.I.C.D. reports communication development in age scores occurring in discrete 4 month blocks (that is 16 months, 20 months, 24 months) so by virtue of this scoring method and the limited chronological age range of the infant participants, it is not surprising that the S.I.C.D. appeared to be a nondiscriminating instrument which did not significantly correlate with other more sensitive measures of linguistic skills. The intended purpose of the S.I.C.D. is primarily to assist in program planning for the language-delayed child. It also provides a clinical assessment tool for children's communication skills . Use of the S.I.C.D. for the initial confirmation or identification of level of language skills in potential research subjects is appropriate. However, the S.I.C.D. appeared to be ineffectual as an identifier of subtle or minor differences in language development. McCarthy (1986) and Girolametto (1985) also utilized the S.I.C.D. as a standardized measure of linguistic development and found that increases in lexicon size were not reflected by the S.I.C.D. as administered in pre- and post-treatment testing. Future research should take this into account when choosing a formal language

measure.

Lexicon size also failed to correlate with the Mental Development and Psychomotor Indices of the Bayley. This finding may truly reflect the different domains of development measured by each. Currently, the literature does not provide information concerning the relationship between lexicon size and cognitive development as measured by the Bayley. Refering again to the same two children (# 5 & #10), the child using 9 words expressively performed at the 19 month and 18 month levels in the M.D.I and P.D.I. respectively while the boy using 45 words expressively performed at the 14.5 months and 11.9 months level respectively. In clarification of the relatively low P.D.I. score of child #10, the major cause for the low score was the child's hesitancy to walk independently. He began walking independently one week following testing.

Lexicon size may indeed be independent of cognitive development as measured by the Bayley Scales. As with all the measures obtained and compared within this study, the calculation of the correlation coefficient and the conservatively chosen level of significance reduced the possibility of false indications of significant relationships.

The lack of significant correlations between Type/Token Ratio and the other measures of linguistic development supported the findings of Templin (1957). Templin reported a consistent Type/Token ratio of .50 across age, sex, and socioeconomic status for normally developing children between 3 and 8 years of age. The mean Type/Token ratio calculated for this study was .580 and, in view of the age differences of the children included in the two studies, it would appear that Type/Token Ratio is also consistent during early

linguistic development (15 to 19 months).

Chronological age was nonsignificant in its relationship to lexicon size and Type/Token Ratio. Similarly, Bloom, Hood, & Lightbown (1974) and Volterra, Bates, Benigni, Bretherton, & Camaioni (1979) have reported wide ranges of lexicon sizes for children under 2 years of age. In establishing a sample group for this research, a built-in bias for "early talkers" may have occurred as a result of the entrance criteria. It was necessary for participants to have at least 5 object words in their lexicon in order for them to participate in the Communication Tasks. Children who demonstrated normal development on the S.I.C.D. and the Bayley but did not have 5 object words were eliminated from the sample. Even with this bias, which could have potentially affected the distribution of lexicon size among the participants, a correlation between chronological age and lexicon was not found.

A significant correlation was found between chronological age and the M.D.I. Such a correlation is expected and supported by Nancy Bayley's own research and the standardization procedure employed to convert raw scores into age levels (Bayley, 1969.)

Lexicon Availability and Pragmatic Function

The Communication Tasks were intended to provide opportunities for the occurrence of imperative and declarative performatives. In doing so, statistical analysis of the use of

linguistic performatives (Linguistic Ratios) has indicated that there is not a significant difference between the use of words in either performative. However, the difference was marginally significant in favor of the declarative task, suggesting that children do produce words with varying frequency between the two conditions.

Snyder (1978) has reported significant differences between the linguistic performances of both language-delayed and non-language-delayed children in the two situations. For both groups of children, her data overwhelmingly showed more linguistic responses to the imperative condtion. This is in contrast to this study in which linguistic ratios were higher in the declarative condition. The differences in the findings regarding which performative was more often expressed linguistically may be a reflection of task differences. Snyder (1978) randomized the presentation of imperative and declarative tasks whereas the presentation of the tasks in this study was consistent in presenting the declarative task first. A connection may exist between the fact that the children in this study were more consistent in naming the object during the declarative condition than the imperative condition and that the declarative condition was always presented first. Perhaps the communicative function of naming the object when it was first seen was viewed by the children to be more important or necessary than naming an object which was already a shared topic within view of the child, the mother, and the researcher. A point toward the object would have fulfilled the same communicative function. The sequence effect of always presenting the declarative condition first may be a factor in the results observed. Moreover, the effectiveness of the declarative tasks in eliciting labeling

responses appeared to be increased by the modifications of Holdgrafer & Kysela (1984). Future research should take the possibility of a sequence and task effects into account.

Linguistic Ratio (declarative) as a measure of children's word use for labeling of new situations or objects, can be logically associated with lexicon size, as the significant correlation between the two has supported. As well, in this particular study, only objects within a child's expressive lexicon were presented. This correlation is expected because of the methodology. In light of this, the nonsignificant relationship between lexicon size and Linguistic Ratio(imperative) would appear difficult to explain. Again, the methodology may account for this discrepancy. The sequence and communicative effects that were discussed in regards to the declarative condition always being presented prior to the imperative, may explain why the linguistic ratios vary in their relationship to lexicon size. Words were not used as often in the second condition, that of the imperative.

Interaction Measures and Communicative Functions

The length of turn sequences among mother-child dyads is seen as an important factor in language intervention programs such as MacDonald's (MacDonald & Gillette,1985). With balanced turntaking and a responsive social context, it is hypothesized that expressive language will develop. Programs such as MacDonald's make the assumption that balanced turn-taking is related to language acquistion and that improvements (increases) in one will be paralleled with improvements in the others. Such parallels

are not seen in this sample of normally developing children and their mothers. Mean length of turns, as calculated from the analysis of each dyad's play, did not significantly correlate with chronological age, lexicon size, Type/Token Ratio, or either of the Linguistic Ratios.

The criterion used to define a turn however may partially explain this finding. A turn was considered as continuing if the adjacent behavior occurred within 2 communicative modes of the previous behavior of the partner, within 10 seconds of the previous behavior (either partner), and if the behavior was one of not more than 3 consecutive behaviors by that same partner. By this definition, a child's action with a toy and an immediately following but non-related single-word comment on something by the mother, would constitute a continuation of a turn because of its fulfillment of the temporal and modal stipulations of a turn. The definition of a turn employed for this study did not include a stipulation of joint attention or topic maintanence. This lack of sensivity in discriminating between turns involving shared attention and turns that did not may account for the lack of significance of turn length when correlated to other measures.

In contrast to the nonsignificant relationship of this study, Tomasello & Todd (1983) found that the time spent in joint attentional activities (such as the length of turn sequences which focused on a shared topic) was positively related to vocabulary size. Replication of this study with children at 15 months and 21 months af age (Tomasello, Mannle & Kruger, 1986) also reported positive correlations between time spent in joint attention at 15 months and vocabulary size at 21 months.

Tomasello and Farrar (1986) investigated dyad interaction and in doing so measured number of conversations within a play session(similar to this study's turn sequences) by defining turn conversations as adjacent actions/utterances on a common topic. Videotaping of play sessions at 15 months and 21 months recorded increased linguistic competence but not increased time in joint action (contingent turntaking) as the children got older. The relevance of the fingings of Tomasello and Farrar (1986) to those of this study is impossible to assess because of the variation of sensitivity used in determining turn (conversation) length.

Intuitively, the mode-matched ratio of a turn sequence is related to mean turn length: as mode-matches occur more frequently, the turn-taking exchange would be perpetuated and turn sequences would increase in length. This reasoning however assumes that each mode-matched turn is also topically related to the previous turn (which was not necessarily true in this study). The correlation between mode-matched ratio and mean turn length was not significant, suggesting that the mode-matched nature of a turn sequence is not important in sustaining the sequence. Perhaps joint attention, that is, the maintenance of topic over many turn exchanges is more accurate indicator of the length of the interaction sequence.

In view of the recognition of the limitations of the M.M.R. as calculated, it is not unexpected that M.M.R. did not correlate significantly with lexicon, Type/Token Ratio, or the Linguistic ratios. In contrast, Tomasello & Farrar (1986), using measures sensitive to joint attention, reported that children talked more, engaged in longer conversations, had

mothers who used shorter sentences, and commented more, during bouts of joint attention than other kinds of interaction.

The child's frequency of initiations was positively and significantly correlated with age. This is not a surprising finding. As children become more competent motorically and linguistically they are more capable and eager to attract the adults attention and begin a conversation of his/her own interest.

The child strategy of imitation was surprising in its failure to correlate with neither age, lexicon size, or Type/Token Ratio. It may be that imitation as a general strategy (i.e. both verbal and non-verbal imitation were recorded as occurrences of imitation) is not significantly related to these characteristics but that the occurrence of verbal imitation may show a stronger relationship. However, Leonard, Schwartz, Folger, Newhoff, & Wilcox (1979) also failed to find a significant relationship between child imitation and lexicon size despite the fact that their definition of imitation included only verbal imitations. The results of a series of experiments by Leonard et. al. (1979) indicated that imitated words emerged no sooner in the child's spontaneous lexicon than unimitated words. Also, children's performance on a naming task did not vary according to whether they had previously imitated the words or not.

Among the communication strategies employed by the children and their mothers, mothers' use of imitation correlated significantly with children's frequency of imitation. MacDonald & Gillette (1985) and Manolson (1983) predict such a relationship with the design of their intervention programs. Adults are taught to imitate their children as a

means of encouraging their children's use of imitation.

The specific role played by imitation in the acquisition of lexical items is not yet known. Work by Bloom, Hood, & Lightbown (1974) has suggested the importance of children's imitations of lexical items especially within context, but could not suggest how the transition from imitation to spontaneous production occurs. Stine, & Bohannon (1983) reported the target of lexical imitations to include novel object words, as well as familiar words, and concluded that imitation does sometimes serve a function in the acquisition of vocabulary items.

The frequency of maternal expansions of children's utterances or actions did not correlate significantly with the children's C. A., lexicon size, or Type/Token Ratio. In fact, there was a generally low rate of expansions for all mothers in this study. Penner (1987) noted that parental expansions are the most frequent when children are in Brown's Stage II of language development. That observation is supported by the sesults of this study. Mothers do not appear to expand frequently when chidren are not yet past one word utterances. Mothers are more likely to expand when children are older and further along in their language development than the children involved in this study. With these findings in mind it might be logical to expect no correlation between maternal expansions and child's age and lexicon.

Scherer & Olswang (1984) have suggested that expansions serve to continue the conversational topic initiated by the child and to encourage the child to imitate the mother's expansion of her own utterance. Their own research as well as that of Folger &

Chapman (1978) and Seitz & Stewart (1975) have indicated a contingent relationship between expansions and imitations. Findings of this study marginally concur with the published findings. The correlation between expansions and children's imitations was that of .5173 ($p < .05$ - critical value of .532). In all likelihood, occurrences of maternal expansions are correlated with occurrences of child imitation.

The relationships between the Communicative Strategies and the children's Linguistic Ratios, as examined by this study, are confusing. The only relationship that appeared significant was between children's use of imitation and Linguisitic Ratio (imperative). Again, the sequential effects of the methodology that dictated the presentation of declarative situations prior to the imperative situation may be questioned in creating the difference between the conditions. However, the illogical significance of imitation in relationship to the L.R. (imp), but not L.R. (dec), cannot be explained other than as an artifact of statistical method employed (further discussion to follow).

Examination of the relationships between the Communicative Strategies and the Turn-taking measures showed significant correlations between the matched-mode ratio (M.M.R.) and the child's use of initiation and mother's use of expansions. A large M.M.R. is an indicator of a dyad's ability to maintain exchanges in modes similar to that used by the partner in the previous turn. By definition, a mother's expansion occurs in a mode not more than one mode higher or lower than the previous turn. It is not unexpected then that M.M.R. and expansions show a relationship, for half of the M.M.R. is represented by the mother's responses in respect to the communication modes utilized by the child.

Therefore every expansion serves as an incidence of a maternal mode-matched response. Both expansions and M.M.R. are reflections of a dyad's sensitivity and responsivity to each others' turns.

It may be that a child is more likely to initiate a topic if she is likely to receive a response that he/she could respond to (that is, maintain the topic). Thus a mother who typically pays attention to and responds to a child within one mode of the child's initiation could contribute to a high M.M.R. and possibly reinforce the child's initiations.

Limitations of the Statistics

Consideration of the limitations of the statistical method employed is appropriate at this time. The nature of the correlation coefficient applied ($p>.05$) is such that approximately 5% of the calculations may be significant as an artifact of the statistic itself, that is, will present as a significant relationship when none exists (Type II error). With the 48 correlations reported from the matrix, it is probable that 2 to 3 of the correlations would be significant regardless of the true relationship. Prior to definitive statements, replications and further study are warranted.

Post-hoc Findings

An overview of the correlation matrices indicated some significant relationships that were not specified for examination by the research questions. These relationsips are

listed as follows. Table 8 displays these post-hoc correlations.

The Mental Development Index of the Bayley Scales correlated significantly with the Receptive scale of the S.I.C.D., the Psychomotor Development Index of the Bayley, M.M.R., and mothers' use of expansion. The significant correlations between the M.D.I. and the S.I.C.S.R. can be explained by the similarity of many of the tasks on these scales. For example both scales have items assessing children's comprehension of words, the following of simple instructions, and motor and vocal imitation. Standardization testing on the Bayley Scales (Bayley, 1969) resulted in a significant correlation of .46 between the two indices. Thus, the significant correlation found between the M.D.I. and P.D.I. in this study supports the significant relationship reported by Bayley. No obvious explanations for the significant relationships between the M.D.I., and the M.M.R. and mothers' expansions exist.

The Receptive and Expressive scales of the S.I.C.D. correlated significantly with each other. Standardization testing completed by Hedricks et al. (1984) resulted in a reported correlation of .9477 between the two scales of the S.I.C.D. The correlation calculated in this study supported the relationship found by Hedricks et al.

Both mothers' and children's use of imitation strategy correlated significantly with the children's scores on the Receptive Scale of the S.I.C.D. It is an interesting finding that both counts of imitation correlate significantly with the S.I.C.D.R. Further research is needed to

TABLE 8

Correlated Measures - Post-hoc

Measures	1.	2.	3.	4.	5.	6.	7.	8.
1. Mental Development Index (MDI)	-	.7286**	.7109**	.6480*	.5331*	.4871	.2457	.4059
2. Psychomotor Development Index (PDI)		-	.4870	.5273	.5052	.6406*	.2216	.4757
3. Mode Matched Ratio (MMR)			-	.9259***	.3887	.1678	-.0338	.4577
4. Expansion Strategy - Mother				-	.4904	.2551	-.0405	.5003
5. Sequenced Inventory of Communication Development - Rec.					-	.6201*	.6581*	.5322*
6. Imitation Strategy Child						-	.6033*	.2045
7. Imitation Strategy Mother							-	.2859
8. Sequenced Inventory of c. Development - Exp.								-

Note: *p < .05 **p < .01 ***p < .001

determine if this is a true relationship or an artifact of the statistics employed.

Implications for Further Research

Several specific items have been recognized for consideration in future research. The use of the S.I.C.D. and its method of reporting communication age scores in 4 month blocks limits the usefulness of the formal language measure as a discriminating tool of language development. When used to identify children as within normal limits or to document delayed

skills, it is an appropriate tool. However, as a measure of improvement in a treatment study or an assessment tool for subtle differences, it appears to be poor. Hedricks et al. (1984) designed the test as a screening for the clinical identification of language delays; it fulfills this purpose.

The many characteristics of dyad interaction can be very subtle and the importance of each characteristic may not be realized until more sensitive measures are devised. Measures that focus on turn-taking as the main element of interaction may fail to record joint attention or recognize the extent of its role in language acquisition. The recent work of Tomasello and Farrar (1986) may be a step toward accurate recording of joint attention between dyads and insights into its relationship to lexicon development. Future research should examine the sensitivity of its recording devices.

The scoring system utilized in the communication tasks of this study recorded a

continuum of non-linguistic and linguistic performatives. In the data analysis of the study, only the distinction between non-linguistic and linguistic responses were utilized. In future research the richness of such a recording system should be fully utilized in order to assess the relationship between pragmatic development and the other aspects of language development.

Intervention Issues

Several findings in this study raise issues in regard to current intervention practises. In particular, the lack of significant correlations between the following measures are noteworthy:

1)lexicon size to turn length, mode-matched ratio, child imitations, and maternal expansions;

2)turn length to mode-matched ratio;

3)maternal expansions to child imitations (calculated to be a marginal correlation).

Programs such as those of MacDonald and Manolson teach adults to increase the various dyad characteristics examined when playing with their child. Specifically, parents are taught to follow a child's lead by imitating and expanding upon the child's turn. Parental imitation is seen as important for extending the turn sequence, maintaining the same communication level as the child, and for demonstrating imitation. These factors of dyad interaction are seen to create situations appropriate for, and forerunners to, lexical

and grammatical learning(MacDonald, Gillette, Bickley, & Rodriguez, 1984) .

The marginally significant correlation between maternal and child imitations is suggestive of the notion that parental imitation can be related to a child's. However, the nature of this relationship can not be discerned from this methodolgy. A causal relationship between the two, as dyad intervention implies, is beyond the scope of this research.

With the exception of imitation strategies, the results of this study may suggest that there are no relationships between target behaviors of intervention among dyads of children between 15 and 19 months who are developing language normally. It may be however, that some children need very few expansions or other kinds of language examples to benefit from them and that others, particularly those with delays, may need many more to benefit from them (Spradlin & Siegel, 1982). It might also be as suggested by Penner(1987), that most expansions occur (naturally) later when children begin to combine words.

There is nothing in these finding to indicate that dyad strategies are not supportive of language acquisition. However, the descriptive nature of the research as well as the correlational findings do not lead to the suggestion that maternal strategies are prerequistes to language development in normal children between 15 and 19 months.

Summary

The study has examined the relationships that exist between a child's expressive language acquisition and interaction characteristics and communication strategies in process when the child participates with her mother in a dyadic play situation. The aspects of the child's expressive linguistic skills that were considered included pragmatic use of lexicon as well as lexicon size and performance on formal normative measures. Interaction characteristics which were observed included turn-taking. Communication strategies such as imitation and expansion were also observed and analyzed.

The survey nature of this study has resulted in much information and particularly many directions for further study. It has provided no conclusive evidence for any of its questions, only indications of trends. The advantage of work such as this is its ability to survey many things at once and provide a framework for more specific questions and a tighter methodology in future studies. The correlations obtained when examining the relationships between the communication strategies and other factors, indicate that further work is required.

The use of the multi-level Imperative and Declarative protocols in the Communication Tasks allowed for a record of the transition and interchange between children's lingusitic and non-linguistic communication skills. In further studies, a more refined use of this protocol than the simple dichotomy of linguistic versus non-linguistic responses may be useful. The dichotomy adopted limited the descriptive value of the pragmatic situations.

Conclusion

The research questions in this study addressed the need for examination of the relationships that exist between the many interaction characteristics that influence and support language acquisition. The study has been successful in the identification of certain characteristics as targets for further research and by narrowing the field of characteristics to consider.

It is clear that further and more focussed research is necessary to determine the extent of the relationships that exist between the many lingusitic, interactional, and strategic characteristics of mother-infant dyads at play.

Bibliography

Ainsworth, M. D. S., Bell, S. M., & Stayton, D. J. (1974). Infant-mother attachment and social development: " Socialization" as a product of reciprocal responsiveness to signals. In M. P. M. Richards (Ed.), The integration of a child into a social world. London: Cambridge University Press.

Austin, J. (1962). How to do things with words. Oxford: Oxford University Press.

Barnes, S., Gutfreund, M., Satterly, D., & Wells, G. (1983). Characteristics of adult speech which predict children's language development. Journal of Child Language, 10. 65-84.

Bates, E. (1976). Language and Context: The acquisition of pragmatics. New York: Academic Press.

Bates, E., Camaioni, L., & Volterra, V. (1979). The acquistion of performatives prior to speech. In E. Ochs & B. Scheffelin (Eds.), Developmental Pragmatics. New York: Academic Press.

Bayley, N. (1969). Bayley Scales of Infant Development. New York: Psychological Corporation.

Bloom, L. (1970). Language development: Form and function in emerging grammars. Cambridge: M.I.T. Press.

Bloom, L. (1973). One word at a time: The use of single word utterances before syntax. The Hague: Mouton.

Bloom, L., Hood, L., Lightbown, P. (1974). Imitation in Language Development: If, When, and Why. Cognitive Psychology, 6, 380-420.

Bloom, L., Rocissano, L., & Hood, L. (1976). Adult-child discourse: Developmental interaction between information processing and linguistic knowledge. Cognitive Psychology, 8, 521-552.

Blurton-Jones, N.G. (1972). Ethological Studies of Child Behavior . London: Cambridge University Press .

Bowerman, M. F. (1973). Structural relationships in children's utterances" Syntactic or semantic? In T. E. Moore(Ed.), Cognitive development and the acquistion of language . New York: Academic Press.

Broen, P. A. (1972). The verbal environment of the language learning child. American Speech and Hearing Monograph , No. 17.

Bronfenbrenner, U. (1979). The Ecology of Human development. Cambridge, MA.: Harvard University Press.

Brown, R. (1973). A first language. Cambridge, Mass.: Harvard University Press.

Brown, R., & Fraser, C. (1964). The acquistion of syntax. Monographs of the Society for Research in Child Development, 29, 43-78.

Bruner, J. (1974). From communication to language: A psychological perspective. Cognition , 3, 255-277.

Bruner, J. (1975). The otogenesis of speech acts. Journal of Child Language, 2, 1-19.

Bruner, J. (1977). Early socialization interaction and language acquisition. In H. R. Schaffer (Ed.) , Studies in mother-infant interaction. London: Academic Press.

Bruner, J. (1978). Acquiring the use of language. Paper presented at the Berlyne Memorial Lecture at the University of Toronto, March. In James D. MacDonald & Yvonne Gillette, Communicating with handicapped persons: roles of parents and professionals. Unpublished paper.

Bruner, J. (1983). Child's talk: Learning how to use language. Cambridge: Cambridge University Press.

Cazden, C. B. (1965). Environmental assistance to the child's acquisition of grammar. Unpublished doctoral dissertation, Harvard University. In T. G. Cross, (1978) Mothers' Speech and its Association with Rate of Linguistic Development in Young Children (pp.199-216). In N. Waterson & C. Snow (Eds.), The Development of Communication. New York: Wiley.

Chafe, W. L. (1970). Meaning and the structure of language. Chicago: University of Chicago Press.

Chapman, R. S. (1981). Exploring children's communicative intents. In Jon F. Miller (Ed.), Assessing language production in children: Experimental procedures. Baltimore: University Park Press.

Chapman, R., & Kohn, L. (1978). Comprehension strategies in two and three year olds: *Animate agents as probable events.* Journal of Speech and Hearing Research, 21, 746-761.

Chomsky, N. (1957). Syntactic structures. The Hague: Mouton.

Chomsky, N. (1965). Aspects of the theory of syntax. Cambridge: M.I.T. Press.

Collis, G. M., & Schaffer, H. R. (1975). Synchronization of visual attention in mother-infant pairs. Journal of Child Psychology and Psychiatry, 16, 315-320.

Cook, T. D. & Campbell, D. T. (Eds.). (1979). Quasi-experimentation: Design and analysis issues for field settings. Chicago: Rand-McNally.

Corrigan, Roberta. (1978). Language development as related to stage 6 object permanence development. Journal of Child Language , 5, 173-189.

Cromer, R. F. (1970). Children are nice to understand: Surface structures, clues for the recovery of a deep structure. British Journal of Psychology, 61, 397-408.

Cross, T. G. (1978). Mothers' speech and its association with rate of linguistic development in young children. In N. Waterson & C. Snow (Eds.), The development of communication. New York: Wiley.

Cross, T. G. (1975). Some relationships between 'Motherese' and linguistic level in accelerated. Papers and reports on child language development ,10. Stanford University. In Cross, T. G. (1978). Mothers' speech and its association with rate of linguistic development in young children. In N. Waterson & C. Snow (Eds.), The development of communication. New York: Wiley.

Cross, T. G. (1970). Some investigations into the nature of linguistic environment of twelve two-year-old children. Unpublished manuscript, University of Melbourne. In Cross, T. G. (1978). Mothers' speech and its association with rate of linguistic development in young children. In N. Waterson & C. Snow (Eds.), The development of communication. New York: Wiley.

Dore, J. (1974). A pragmatic description of early language development. Journal of Psycholinguistic Research, 4, 343-350.

Dore, J. (1975). Holographs, speech acts and language universals. Journal of Child Language, 2, 21-40.

Edwards, E. (1973). Sensorimotor intelligence and semmantic relations in early child grammar. Cognition, 2, 395-434.

Fey, M., Leonard, L., & Wilcox, K. (1981). Speech style modification of language-imparied children. Journal of Speech and Hearing Disorders, 46, 91-96.

Fillmore, C. J. (1968). The case for case. In E. Bach and R. T. Harms (Eds.), Universals in linguistic theory. New York: Holt, Rinehart and Winston.

Folger, J., & Chapman, R. (1978). A pragmatic analysis of spontaneous imitations. Journal of Child Language, 5, 7-24.

Foster, S. (1985). The development ~~of~~ discourse topic skills by infants and young children. Topics in Language Disorders, 5, 31-45.

Fraser, C., & Roberts, N. (1975). Mothers' speech to children of four different ages. Journal of Psycholinguistic Research, 4, 9-16.

Garvey, C. (1975). Requests and responses in children's speech. Journal of Child Language, 2, 41-63.

Girolametto, L. (1985, May). Model for intervention: Developing dialogue between mothers and delayed children. Paper presented at the Annual Convention of the Canadian Speech and Hearing Association, Toronto, Ontario.

Gleitman, L. R., Newport, E. L. and Gleitman, H. (1984). The current status of the motherese hypothesis. Journal of Child Language, 11, 43-79.

Gopnik, A., and Meltzoff, A. N. (1984). Semantic and cognitive development in 15- to 21-month-old children. Journal of Child Language, 11, 495-513.

Halliday, M. (1975). Learning how to mean: Explorations in the development of language. London: Edward Arnold.

Harris, M., Jones, D., & Grant, J. (1983). The nonverbal context of mothers' speech to infants. First Language, 4, 21-30.

Hedrick, D. L., Prather, E. M., and Tobin, A. M. (1984). Sequenced Inventory of Communication Development, Revised Edition. Seattle: University of Washington Press.

Holdgrafer, G. & Kysela, G. M. (1984). Social discourse and language development. Research Grant. University of Alberta.

Hovell, S. P., Schumaker, S. B., & Sherman, J.A. (1978). A comparison of parents' models and expansions in promoting children's acquistion of adjectives. Journal of Exceptional Child Psychology, 25, 41-57.

Hunt, J. (1961). Intelligence and experience. New York: Ronald Press.

Kaye, K. (1977). Toward the origin of dialogue. In H. R. Schaffer (Ed.), Studies in mother-infant interaction . London: Academic Press.

Kazdin, A. E. (1982). Single-case research designs: Methods for clincial and applied settings. New York: Oxford University Press.

Kratochwill, T. R. (1978). Single subject research: Strategies for change. New York: Academic Press.

Kysela, G. M. , & Barros, S. (1983). Integration of exceptional children within Alberta Day Care and Early Childhood Services. Edmonton: Publication Services, University of Alberta.

Lasky, E. Z., & Klopp, K. (1982). Parent-child interactions in normal and language-disordered children. Journal of Speech and Hearing Disorders, 47, 7-18.

Leonard, L., Cole, B., & Steckol, K. (1979). Lexical usage of retarded children: An examination of informativeness. American Journal of Mental Deficiency, 84, 49-54.

Leonard, L., Schwartz, R., Folger, K., Newhoff, M., & Wilcox, J. (1979). Children's imitations of lexical items. Child Development, 50, 19-27.

Lewis, M. and Rosenblum, L.A. (Eds.). (1974). The effects of the infant on its caretaker. New York: Wiley.

Ling, D., & Ling, A. H. (1974). Communication development of the first three years of life. Journal of Speech & Hearing Research, 17, 146-159.

Locke, A. J. (1972). From out of nowhere. In M. von Ragflen-Engel & Y. Lebrun (Eds.), Baby talk and infant speech. Holland: Swets and Zeitlinger.

MacDonald, James D. (1985). Language through conversation: A model for Intervention with language-delayed persons. In S. F. Warren & A. K. Rogers-Warren, (Eds.), Teaching Functional Language. Baltimore: University Park Press.

MacDonald, J., and Gillette, Y. (1984). Conversation engineering: A pragmatic approach to early social competence. Seminars in Speech and Language, 5, 171-183.

MacDonald, J., and Gillette, Y. (1985). Communicating with Handicapped Persons: Roles of Parents and Professionals. Unpublished paper. The Ohio State University.

MacDonald, J. D., Gillette, Y., Bickley, M., & Rodriguez, C. (1984). ECO conversation routines. Columbus: The Nisonger Center.

Manolson, A. (1983). It takes two to talk. Toronto: Hanen Early Language Resource Center.

McCarthy, C. (1986). The effects of joint activity intervention on children's pragmatic development. Unpublished master's thesis, University of Alberta, Edmonton, Alberta.

McLean, J. E., and Synder-McLean, L. K. (1978). A transactional approach to early language training: Derivation of a model system . Toronto: Charles E. Merrill

Publishing Company.

Miller, J., & Yoder, D. (1972). A syntax teaching program. In J. McLean, D. Yoder, & R. Schiefelbusch (Eds.), Language intervention with the retarded. Baltimore: University Park Press.

Nelson, K. (1974). Concept, word and sentence: interrelations in acquisition and development. Psychological Review, 81, 267-285.

Newport, E. L., Gleitman, H., & Gleitman, L. R. (1977). Mother, I'd rather do it myself: some effects and non-effects of maternal speech style. In C. E. Snow & C. A. Ferguson(Eds.), Talking to children: language input and acquisition. New York: C.U.P.

Ninio, A. & Bruner, J. (1978). The achievement and antecedents of labelling. Journal of Child Language, 5, 1-15.

Olson, D. (1970). Language and thought: Aspects of a cognitive theory of semantics. Psychological Review, 77, 257-73.

Parisi, D., & Antinucci, F. (1976). Elementi di grammatica. Turino: Boringhieri, 1973. Published in English translation as Essentials of grammar (trans. Elizabeth Bates). New York: Academic Press. In E. Ochs & B. Scheffelin (Eds.), Developmental Pragmatics. New York: Academic Press.

Pawbly, S., F. (1977). Imitative Interaction. In H. R. Schaffer (Ed.), Studies in mother-infant interaction (pp. 203-223). London: Academic Press.

Penner, S. (1987, March). Parental responsiveness to the grammatical and non-grammatical utterances of their children. Paper presented to the Faculty of Rehabilitation Medicine, University of Alberta, Edmonton, Alberta.

Piaget, J. (1952). The origins of intelligence in children. New York: W.W. Norton.

Piaget, J. (1954). The constructure of reality in the child. New York: Basic Books.

Ratner, N., and Bruner, J. (1978). Games, social exchange and the acquistion of language. Journal of Child Language, 5, 391-401.

Rowan, L. E., Leonard, L. B., Chapman, K., & Weiss, A. L. (1983). Performative and presuppositional skills in language-disordered and normal children. Journal of Speech and Hearing Research, 26, 97-106.

Scherer, N. J., and Olswang, L. B. (1984). Role of mothers' expansions in stimulating children's language production. Journal of Speech and Hearing Research, 27, 387-396.

Schlesinger, I. M. (1971). Production of utterances and language acquisition. In D. Slobin (Ed.), The ontogenesis of grammar. New York: Academic Press.

Seitz, M., & Stewart, C. (1975). Limitations and expansions: Some developmental aspects of mother-child communications. Developmental Psychology, 11, 763-769.

Sinclair-de-Zwart, H. (1969). Developmental psycholinguistics. In D. Elkind & J. H. Flavell(Eds.), Studies in Cognitive Development. New York: Oxford University Press.

Sinclair-de-Zwart, H. (1973). Language acquisition and cognitive development. In T. E. Moore(Ed.), Cognitive development and the acquisition of language. New York: Academic Press.

Slobin, D. I. (1973). Cognitive prerequisites for the development of grammar. In C. A. Ferguson and D.I. Slobin, Studies of child language development. New York: Holt, Rinehart and Winston.

Smolak, L. (1982). Cognitive precursors of receptive vs. expressive language. Journal of Child Language , 9, 13-22.

Snow, C. (1972). Mother's speech to children learning language. Child Development , 43, 549-565.

Snow, C. E. (1976). The development of conversation between mothers and babies. Journal of Child Language, 4, 1-22.

Snow, C. (1977). Mothers; speech research: From input to interaction. In C. Snow and C. Ferguson (eds.) , Talking to children . London: Cambridge University Press.

Snow, C. E. (1979). The uses of imitation. Journal of Child Language , 8, 205-208.

Snyder, L. (1978). Communicative and cognitive abilities and disabilities in the sensorimotor period. Merrill-Palmer Quarterly, 24, 161-180.

Snyder-McLean, L. K., Solomonson, B., McLean, J. E., & Sack, S. (1984). Structuring joint action routines: A strategy for facilitating communication and language development in the classroom. Seminars in Speech and Language, 5, 3, 213-225.

Stine, E. Lotz, & Bohannon, J. N. (1983). Imitations, interactions, and language acquisition. Journal of Child Language, 10, 589-603.

Sugarman, S. (1973). A description of communicative development in the pre-language child. Unpublished honors thesis, Hampshire College.

Sugarman-Bell, S. (1978). Some organization aspects of pre-verbal communication. In I. Markova(Ed.), The social context of language. London: Wiley.

Templin , M. C. (1957). Certain language skills in children: Their development and interrelationships . Child Welfare Monograph No. 26. University of Minnesota Press, Minneapolis.

Tomasello, M., & Farrar, M. J. (1986). Joint attention and early language. Child Development, 57, 1454-1463.

Tomasello, M., Mannle, S., & Kruger, A. (1986). The linguistic environment of one to two year old twins. Developmental Psychology, 22, 169-176.

Tomasello, M. & Todd, J. (1983). Joint attention and lexical acquisition style. First Language, 4, 197-212.

Uzgiris, I. & Hunt, J. MCV. (1975). Assessment in infancy: ordinal scales of psychological development. Urbana: University of Illinois Press.

Ventry, I. M. & Schiavetti, N. (1986). Evaluating research in speech pathology and audiology (2nd ed.). New York: Macmillan Publishers.

Volterra, V., Bates, E., Benigni, L., Bretherton, I., & Camaioni, L. (1979). First words in language and action: A qualitative look. In Elizabeth Bates, (Ed.), The emergence of symbols: cognition and communication in infancy. New York: Academic Press.

Vygotsky, L. S. (1962). Thought and language. (rev. ed.). Cambridge: M.I.T. Press.

Appendices

APPENDIX A

TOYS UTILIZED IN TURNTAKING TASKS

TOYS UTILIZED IN TURNTAKING TASKS

1. Fisher-Price Clanking Clown: a Cylindrically-shaped toy whose main function is to roll. The clowns inside the cylinder produce a clanking sound when rolled.

2. Tomy Gas Pump: a small plastic replica of a gas pump can be played with in several ways:

a)pushing a button on top of the pump produces a ringing noise and changes pictures within a window display

b)turning a dial produces a cranking noise and also changes pictures in the window display

c)gas nozzle can be removed and replaced in a slot on the side of the pump

3. Fisher-Price Drum: a plastic drum with metal "keys" on top. When hit, the keys produce varying musical tones. The drum has a stick which can be removed from a handle on the side of the drum and used to hit the drum. In addition, the handle can be rotated, producing a cranking noise.

4. Tonka Top: a plastic spin top. When the top is pressed with the hand, it rotates, producing a multicolored swirled pattern.

5. Fisher-Price Creative Blocks: large, easily stackable plastic blocks.

6. Fisher-Price Snap-Lock Beads: large, plastic multicolored beads which can be snapped together and pulled apart.

APPENDIX B

MATERNAL INSTRUCTIONS FOR INTERACTION SESSIONS

MATERNAL INSTRUCTIONS FOR INTERACTION SESSION

First of all, I will ask you both to come sit on the blanket and stay on here as much as possible. As we are videotaping, this will help with our taping and focussing.

I'm going to give you a series of toys, one at a time, to use in playing with your child. Each toy will involve playing by taking turns: you take a turn, (s)he takes a turn, you take a turn, (s)he takes a turn and so on. I will show you specifically how to take turns with each toy.

Encourage your child to keep taking turns with you for as long as possible. To keep him/her interested, talk to him/her, use facial expression, actions, or whatever you wish.

We would like to tape 2 minutes of play with each toy. However, if (s)he is uninterested in any of the toys, I will come in early with another toy.

APPENDIX C

SPECIFIC TOY INSTRUCTIONS

SPECIFIC TOY INSTRUCTIONS

1. Fisher-Price Clanking Clowns: I would like you to roll this toy back and forth between you. You roll it to him/her and (s)he rolls it to you, back and forth. Encourage him/her in whatever way you can to keep playing.
2. Tomy Gas Pump: This is a good toy for turn-taking. You take a turn pushing the button for noise, he/she takes a turn, you take a turn, etc.
3. Fisher- Price Drum: Take brief turns with this drum, perhaps a "note" or two each. Remember to encourage him/her and see how many times you can pass the stick back and forth for turns.
4. Tonka Spinning Top: You will have to show _____ how to activate the spinning top by slowly pressing down. Then, take turns making it spin: your turn, his/her turn, your turn, his/her turn, etc.
5. Fisher-Price Snap-Lock Beads: Take turns taking the beads out of the box one at a time and making one long chain. (S)he takes one out of the box and adds it to the chain: you take one out and add it to the chain, etc. so that you are both contributing to the one chain. Go ahead and take your turn first.
6. Fisher-Price Creative Blocks: These blocks can be used to build vertical towers. Again, the idea is to take turns and to keep your child playing with you for 2 minutes.

APPENDIX D

MATERNAL INSTRUCTIONS FOR COMMUNICATION TASKS

MATERNAL INSTRUCTIONS FOR COMMUNICATION TASKS

I am going to present some objects to your child and observe how (s)he communicates about them. I am interested in what your child does on his/her own, so please do not prompt. For example, try not to say "What's that?" or "Say _____". However if your child speaks to you, you may certainly answer or if (s)he asks for help, please help him/her.

APPENDIX E

THE PRESCHOOL OBSERVATION SYSTEM, REVISED (KYSELA & BARROS, 1973)

THE PRESCHOOL OBSERVATION SYSTEM, REVISED (KYSELA & BARROS, 1973)

BEHAVIORAL CATEGORIES: DEFINITIONS

B Initiate: a behavior directed toward another person through the use of and action, vocalization, word or phrase that was not apparently elicited by another person's immediately preceding verbal or non-verbal behavior.

R Respond: an action, vocalization, word or phrase which was apparently elicited by another person's action, vocalization, word, phrase.

I Imitate: an overt repetition of an action, vocalization, word, phrase. Imitated behaviors must contain all or part of the modeled behavior with no changes except minor deletions which do not alter the mode level of the behavior. Examples of acceptable deletions are:

Action level: Mother bangs drum 4 times; child bangs drum 3 times

Vocalization Level: Mother says "oo-ee-oo-ee"; child says "oo-ee."

Word Level: Mother says "ball"; child says "bah."

Phrase Level: Mother says "shut the door"; child says "shut door."

S Signal: an action, vocalization, word, or phrase which was apparently intended to prompt a response from another person and which follows a previously unsuccessful attempt. Examples are:

Mother: ball

Child: _____

Mother: bah-bah-bah-bah

Child: bah

Mother: Great!

G Physical Guidance: physical contact intended to assist another person to complete a specific activity.

COMMUNICATION MODES: DEFINITIONS

A Action: a non-verbal motor-gestural behavior.

V Vocalization: a single phoneme (i.e. "m"), or a multiphonemic production (i.e."oo-ee") which is non-linguistic in intent.

W Word: a single word or word approximation.

P Phrase: a phrase consisting of two or more words or word approximations.

APPENDIX F

THE PRESCHOOL OBSERVATION RECORD ANALYSIS FORM

PRESCHOOL OBSERVATION RECORD Page __ of __

Child _____ Scorer _____

Parent _____

Date _____

ADULT	CHILD	ADULT	CHILD
B R I S G A V W P	B R I S G A V W P	B R I S G A V W P	B R I S G A V W P
B R I S G A V W P	B R I S G A V W P	B R I S G A V W P	B R I S G A V W P
B R I S G A V W P	B R I S G A V W P	B R I S G A V W P	B R I S G A V W P
B R I S G A V W P	B R I S G A V W P	B R I S G A V W P	B R I S G A V W P
B R I S G A V W P	B R I S G A V W P	B R I S G A V W P	B R I S G A V W P
B R I S G A V W P	B R I S G A V W P	B R I S G A V W P	B R I S G A V W P
B R I S G A V W P	B R I S G A V W P	B R I S G A V W P	B R I S G A V W P
B R I S G A V W P	B R I S G A V W P	B R I S G A V W P	B R I S G A V W P
B R I S G A V W P	B R I S G A V W P	B R I S G A V W P	B R I S G A V W P
B R I S G A V W P	B R I S G A V W P	B R I S G A V W P	B R I S G A V W P

APPENDIX G

COMMUNICATIVE STRATEGIES: DEFINITIONS

COMMUNICATIVE STRATEGIES: DEFINITIONS

1. IMITATION

Action (I-A): Overt repetition of all or part of the immediately previous motor-gestural behavior or an attempt at repetition of that act; occurring within 10 seconds of the partner's behavior.

Communication(I-C): Unelicited overt repetition of all or part of a communicative behavior (vocalization, single word, or phrase; a communicative behavior consisting of a minimum of a single vowel sound i.e. not an audible intake of air). Does not include responses to verbal prompts i.e. "Say ___".

2. EXPANSION

Horizontal/Action(E-H/A): A motor gestural behavior by one partner which 1)includes the immediately previous motor-gestural behavior of the other partner; 2) adds a mode-matched topic-relevant motor-gestural behavior; and 3) occurs within 10 seconds of the previous behavior. Restriction: not an elaboration.

Horizontal/Communicative(E-H/C): A communicative behavior of one partner that 1)includes the immediately previous communicative behavior of the other partner;

2)adds a mode-matched topic-relevant communicative behavior; and 3) occurs within 10 seconds of the previous behavior. Restrictions: not an elaboration.

Vertical (E-V): A behavior by one partner which 1)includes the immediately previous behavior of the partner; 2) adds a topic relevant behavior that upwardly shifts the behavior mode to within 2 mode levels of the partner's behavior; and 3) occurs within 10 seconds of the previous behavior. Examples of within 2 modes: action to vocalization or word, vocalization to word or phrase, and word to phrase.

3. MODEL/INITIATE (Model refers to adult; Initiation refers to child)

Horizontal/Action(M-H/A): A novel motor-gestural behavior that 1) is directed toward the partner; 2)occurs at the same mode as the previous behavior of the partner; 3)is not apparrently elicited by the partner's immediately preceeding behavior; and 4) is a topic-relevant elaboration that does not include imitation of part or all of the previous behavior. Restrictions : 1) If 2 different but mode-matched behavior occur a)within a partner's turn and b)within 10 seconds, only 1 incidence is scored. Example: the child bangs drum; parent bangs floor and turns handle-the parent is scored for one M-H/A or simliarly the child is scored for one I-H/A. 2)Does not include signals. *Models/Initiations that occur at the beginning of a 2 minute segment or a break will be designated 1)horizontal if they occur at the action level and 2) vertical if they occur at the vocalization, word or phrase level.

Horizontal/Communicative(M-H/C): A novel communicative behavior (vocalization, word or phrase) that is 1)directed toward the partner; 2)at the same mode as the previous behavior; 3) is apparently not elicited by the partner's immediately preceeding behavior or is a topic-relevant elaboration that does not include imitation of all or part of the previous behavior. Restrictions: 1) If 2 different but mode-matched behaviors occur a) within a partner's turn and b) within 10 seconds, only one incidence is scored. 2)Not a signal or direction.

Vertical(M-V): A novel communicative, behavior that is 1)directed toward the partner 2) at a higher mode than the partner's previous behavior and within 2 modes(i.e. action to vocalization or word; vocalization to word or phrase; and word to phrase); 3) not apparently elicited by the partner's previous behavior or is a topic-relevant elaboration that does not include imitation of all or part. Restrictions: Does not include signals or directions. * If two different models occur within a turn at different modes, each model is scored(i.e. once at each mode.)

Additional Guidelines

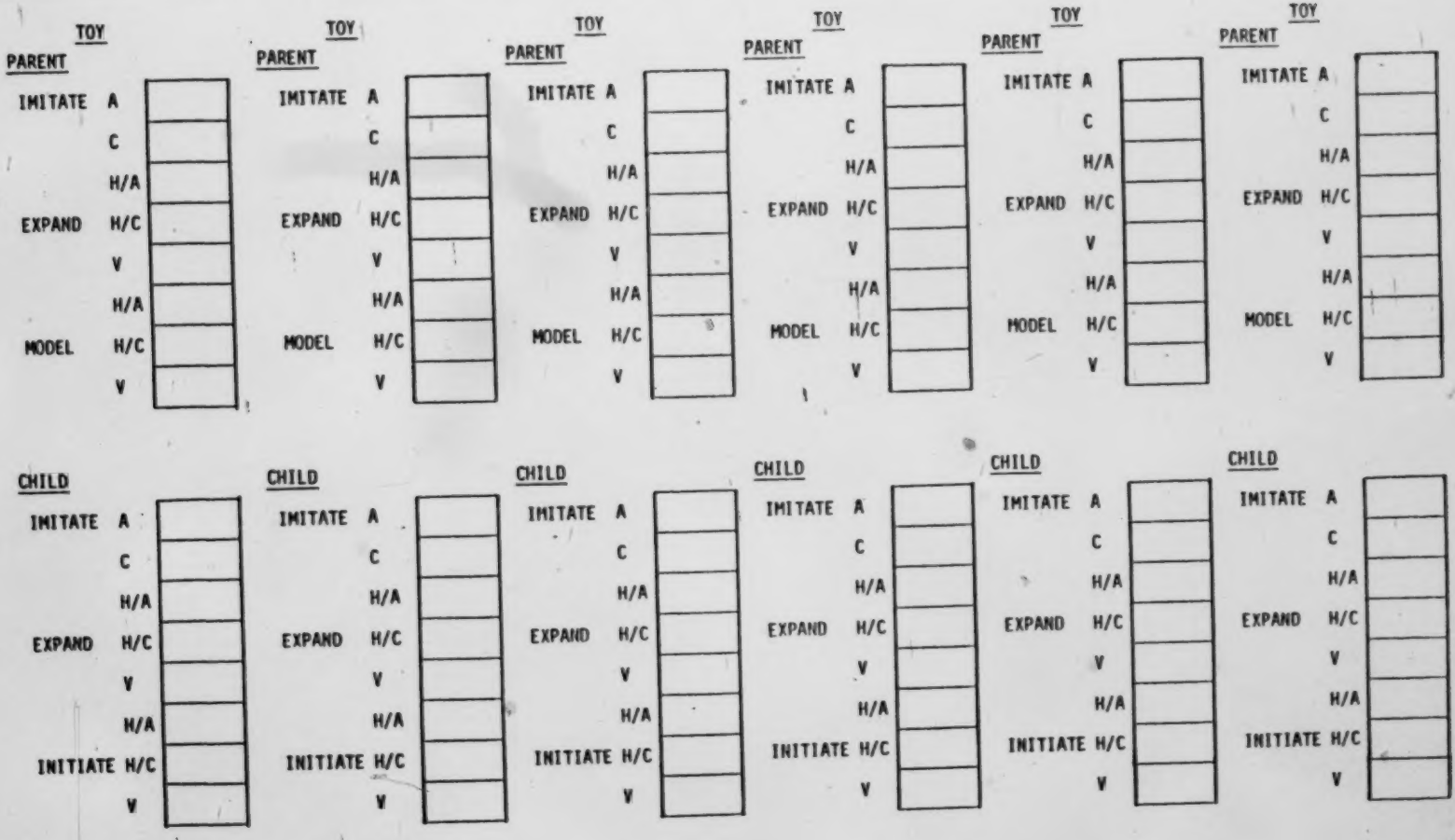
1. Unintelligible utterances are scored as vocalizations.
2. Attempts to re-engage a child in the interaction will not be scored. I.E. action level: shaking the toy to get the child's attention; word level: calling the child's name; phrase level: "Come here!"
3. Uninterrupted multiple repetitions of behavior at the same mode level by the same partner are treated as one behavior.
4. Parental verbal reinforcements will not be scored, I.E."Good!"
5. Children's attempts at motor-gestural behaviors are scored, despite non-completion.
6. Provision of physical guidance by mothers is not scored as a mother behavior.

APPENDIX H

THE COMMUNICATIVE STRATEGIES ANALYSIS FORM

STRATEGIES SCORESHEET

Name _____ Date _____ Tape _____



APPENDIX I

CODING PROCEDURES FOR COMMUNICATION TASKS

CODING PROCEDURES FOR COMMUNICATION TASKS

DECLARATIVE

1. No attempt to get adult attention.
2. Child uses direct manipulation (grasp, approach, reach, manipulation, etc.) to get the adult's attention (and looks at adult)
3. Child uses "showing off" to get the adult to smile, laugh, attend, etc. (using an action and/or smiling and laughing at adult while manipulating the object).
4. Child uses showing, giving and/or pointing to an object to get the adult to attend to it.
5. Child uses a ritualized signal (pointing and vocalizing) to get the adult to attend to the object (could include interpatterning of vocalization with other communication gestures such as showing and giving).
6. Child uses a related nonspecific word to get the adult to attend to the object.
7. Child uses the specific word(label) to get the adult to attend to the object.

IMPERATIVE

1. No attempt to get object or to engage the adult.
2. a) Child looks at adult.

   b) Child looks at and extends arm toward object.
3. a) Child looks at and fusses at the adult.

b) Child extends arm toward object, reaches, vocalizes, and/or points to the object.

c) Child looks at and reaches for the adult's hand.

4. a) Child points to and /or reaches for the object and then looks at the adult.

b) Child points to and/or reaches for the object and then looks at the adult's hand.

c) Child manipulates the container and then looks at the adult and/or pushes container to the adult.

5. a) Child does something to get the adult's attention first (e.g. looks at adult) and then points to and/or reaches for the object.

b) Child looks at adult and pushes the container toward adult without manipulating.

6. Child uses a related nonspecific word to indicate desire for the object.

7. Child uses a specific word (label) to indicate desire for the object.

APPENDIX J

COMMUNICATION TASK SCORE FORM

COMMUNICATION TASK SCORESHEET

TAPE # _____

SUBJECT _____

OBJECT	SITUATION	COMMENTS	SCORING
1. _____	Blocks/bag	_____	_____
	Out of reach	_____	_____
	In container	_____	_____
2. _____	Blocks/bag	_____	_____
	Out of reach	_____	_____
	In container	_____	_____
3. _____	Blocks/bag	_____	_____
	Out of reach	_____	_____
	In container	_____	_____
4. _____	Blocks/bag	_____	_____
	Out of reach	_____	_____
	In container	_____	_____
5. _____	Blocks/bag	_____	_____
	Out of reach	_____	_____
	In container	_____	_____
6. _____	Blocks/bag	_____	_____
	Out of reach	_____	_____
	In container	_____	_____
7. _____	Blocks/bag	_____	_____
	Out of reach	_____	_____
	In container	_____	_____